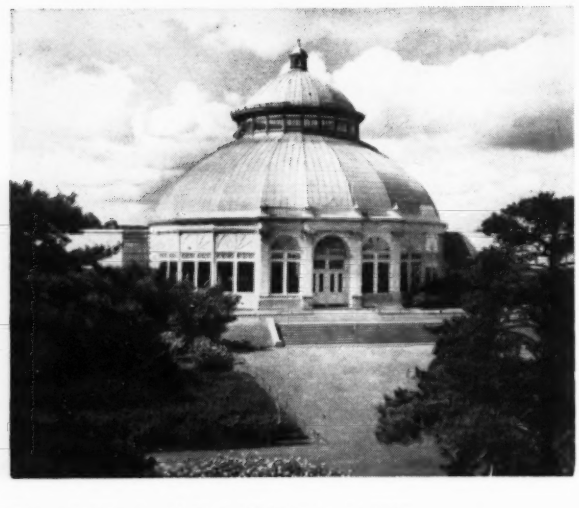
THE GARDEN JOURNAL

OF THE NEW YORK BOTANICAL GARDEN



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International Flower Show, Coliseum, New York City;

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Boston Spring Show, Mechanics Building, Boston — all March 9-15, 1958

Third Eastern Orchid Congress, New York City, May 2-4, 1958; headquarters, American Museum of Natural History

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of The New York Botanical Garden

DOROTHY EBEL HANSELL
Editor

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AMONG OUR CONTRIBUTORS

R. GORDON WASSON, Vice-President of J. P. Morgan & Co., Inc., a trustee of Barnard College, and his wife, VALENTINA P. WASSON, M.D., spent several summers in remote mountainous sections of Mexico completing their research on strange "sacred" mushrooms. Mr. Wasson is a former treasurer of The New York Botanical Garden . . . FRANCIS D. WEST, Honorary President of the John Bartram Association, is a direct descendent of John Bartram . . . "The Evolution of Gardens" by DR. H. W. RICKETT, Bibliographer of The New York Botanical Garden, was originally written as a chapter for BOTANY FOR GARDENERS (Macmillan, 1957) but omitted for lack of space and as being not wholly botanical . . . ALICE L. DUSTAN is garden consultant and planner, author of LANDSCAPING YOUR OWN HOME, garden editor of Newark Star Ledger. Miss Dustan also conducts garden club workshops and adult courses . . . DR. RAY R. HIRT, Senior Professor, Department of Forest Botany and Pathology, State University College of Forestry at Syracuse University, is testing on his own home grounds the hardiness of many American, English, and Oriental hollies. Dr. Hirt is one of the founders and a director of the National Arborists' Association, has served as president of the National Shade Tree Conference, and is active in the Holly Society of America . . . JAMES S. WELLS, who operates his own nursery at Red Bank, New Jersey, is the author of an excellent book on PLANT PROPAGATION PRACTICES (Macmillan, 1955) the second edition of which is now being printed . . . GERTRUDE B. FOSTER, Editor of Herb Grower Magazine, has a charming garden in Connecticut around which she will contribute her new column for The Garden Journal, "The Country Housewife's Garden" . . . T. H. EVERETT is Curator of Education and Horticulturist of The New York Botanical Garden, widely known as lecturer, author of several books and many magazine and newspaper articles on gardening . . . SPENCER HARRISON CAPREAL has gone thoroughly into the cultural requirements that produce fine chrysanthemums, and he puts his studies and observations into practice in his garden at Valhalla, New York . . . HEDWIG MICHEL, newspaper columnist in Fort Myers, Florida, is a keen student of sub-tropical plant material . . . IRVING RESHES, a devotee of Thoreau, Muir, and Whitman, has become thoroughly familiar with The New York Botanical Garden during the twenty-seven years he has been a resident of the Borough of the Bronx. His article, "The New York Botanical Garden in Winter," is culled from his diary of personal observations.

CREDIT FOR ILLUSTRATIONS

We are indebted to the Display Committee, Mrs. Charles Burlingham, Mrs. Richard S. Meredith, Mrs. Donald B. Straus, for the selection of the front cover illustration—photo by E. N. Mitchell of Frontispiece, The Medieval Garden of Herbs, Brunschweig's Liber De Art Distillande, Strassburg, Grüninger 1500, from the volume Herbs For the Medieval Housewife by Margaret B. Freeman—Metropolitan Museum of Art 1943; pp. 2, 3, 4, 5, Valentina P. and R. Gordon Wasson; p. 6, Francis D. West; p. 9, drawing by Alice Dustan; pp. 10, 11, and 12, lower, Zeltsman Photo Craft Studio, p. 12, upper, Alice Dustan; p. 17, Gertrude B. Foster; pp. 18, 19, 20, 21, T. H. Everett; pp. 25, 26, Hedwig Michel; p. 27, E. N. Mitchell; p. 33, Stickeler Photo Craft; p. 34, E. N. Mitchell; p. 35, All-America Gladiolus Selections.

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THE HALLUCINOGENIC MUSHROOMS

By Valentina P. Wasson *and* R. Gordon Wasson

WE ARE SOMETIMES ASKED how it happened that we "discovered" the hallucinogenic mushrooms of Mexico. We didn't discover them, of course. The Indians discovered them, thousands of years ago. The Indians of southern Mexico, who are mycophiles, possess an extraordinary empirical knowledge of the properties of mushrooms. As for the hallucinogenic species, their use, we believe, has been distinctive of the upland peoples of Meso-America as far back as archaeology can enlighten us, and doubtless much further back than that.

In fact, it is a question whether the use of the mushroom is an autochthonous trait of Meso-America or whether it is a common heritage of the peoples of the Pacific basin. We know that such mushrooms are still used by the Kuma people of New Guinea, by hill tribes of Borneo, and by the natives of the Siberian coast between Kamchatka and the Bering Straits. There are tantalizing suggestions that the secret was possessed by the Polynesians, the Chinese, and the peoples of India.

No, we did not discover the hallucinogenic mushrooms. We did not even discover their *use* by the Indians of Mexico. After the first flush of the Conquest, when the Spaniards, alive to the drama of the shock of the two civilizations, were recording all that they saw and heard in New Spain, they reported the adoration of vision-producing mushrooms by the natives. We have assembled a score of early writers who speak of them. But their descriptions hardly help us to identify the kinds of mushrooms that were so used. The ethnographer Bernardino de Sahagún speaks of them as black little mushrooms that grow beneath the grass in field or moor; and again he says that they "are round, have a long stem that is thin and round. . .They taste bad, hurt the throat, and inebriate." For another author they are woodland mushrooms. According to a third, so bad is the taste that the Indians follow them up with a drink or with honey. Francisco Hernández, a botanist, speaks of three kinds: the first is reddish, acrid, "of a not displeasing smell," and provokes uncontrollable laughter; the second makes the eater see all kinds of visions; and the third kind, tawny and somewhat acrid, is sought after by the principal people. Juan de Córdoba in his Zapotec lexicon (1571) defines *nocuana peneeche* as an inebriating mushroom that grows in trees. Finally, Jacinto de la Serna in the early seventeenth century says that they are red, and again that they are small and golden and grow in the mountains.[1]

What are we to make of this testimony? We find a consensus that the mushrooms are bitter, and clearly there are several species. That is all. In the sixteenth century the science of mycology had not been born, and Dioscorides, the first century Greek, was still the chief authority. We look in vain for illustrations to help us. Hernández speaks of his drawings, but they were apparently lost in a fire. We possess only two illustrations, and they are of more interest anthropologically than mycologically.

There followed a silence of centuries. The hallucinogenic mushrooms are forgotten of everyone, save the Indians. Prescott ignores them deliberately, deftly excising them from his source as he tells us of the festivities that attended the beginning of Montezuma's reign.[2] Only a handful of scholars knew they had ever existed, and a few of them mentioned the mushrooms in the books that they wrote for other scholars to read.[3]

Then a strange thing happened. In May 1915 an American ethno-botanist of established reputation, William E. Safford, read a paper before the Botanical Society of Washington declaring that the old writers had made a mistake, and that there were never any hallucinogenic mushrooms. Patronizingly, he speaks of the Spanish "padres" who had mistaken the "mescal buttons" of peyote for mushrooms. This was no half-hearted effort on Safford's part, no tentative surmise aimed at eliciting comment. When his paper was published in the "Journal of Heredity" in July of that year, it was seen to be a major effort, supported by quotations from the old authors, by photographs, and by the negative results of his own inquiries in the Southwest of the United States and northern Mexico. He was categorical, leaving himself no loophole for escape. We find no indication that Safford ever learned of his mistake. He died in January 1926, and in late 1921 he had stood on his previous position.[4]

How did Safford go so wrong? He looked for the mushrooms in the wrong place, misled by an ambiguous passage in Sahagún that he had misread. Sahagún says that the Indians of the north had their peyote, just as we [in the south, where Sahagún was] have our mushrooms. Naturally Safford, putting a wrong construction on the Spanish text and looking for the mushrooms in the north, found none. Futhermore, he was not familiar with the wealth of source material that has come to light since then. He quotes from only three of the old authors, whereas we have assembled twenty who speak of them. Even so, he might have surmised that both Spaniards and Indians could tell a mushroom when they saw one, and that the Indians were using a Nahuatl word, *teo-nanácatl*, meaning "mushroom." Few in Safford's audience had ever heard of the divine mushrooms of Mexico, and now they heard of them only to be apprized that they had never existed. It was an easy victory for him.

Safford's contribution to ethno-mycology apparently drew no fire, not even in Mexico. But in 1919 a Mexican physician, Dr. Blas Pablo Reko, born in Austria of Slavic blood, got wind for the first time that mushrooms were still being used in medico-religious ceremonies. He asserted his faith in the old writers in a Spanish rendering of *teo-nanácatl* that he included in a list of

Nahuatl botanical terms published in that year. In 1923 he took direct issue with Safford in a private letter that still survives. He said that the mushrooms were black and grew in animal manure.[5] But Reko failed to enlist the attention of the learned world.

In 1936 there appeared in Stuttgart a little book, *Magische Gifte,* by one who styled himself "Prof. Victor A. Reko, Member of the Academy of Sciences, Mexico." This Reko, a journalist and anything but a scientist, was first cousin to Blas Pablo. He asserted the existence of the divine mushrooms and was so bold as to give them, sight unseen, a hypothetical name, *Amanita muscaria,* var. *mexicana.* Victor Reko's book attracted attention and went through several editions, the third appearing in 1949. German scientific circles accepted the author at face value, and we have seen in sober German scientific journals confident references to his ghost species! Yet in the very year of publication Victor's guess proved wrong. The distinguished anthropologist, Robert J. Weitlaner, of Austrian birth also, while visiting the Mazatec town of Huautla de Jiménez, in the northern corner of the state of Oaxaca, came upon some of the mushrooms—the first white man in modern times to handle them. He sent them to Blas Pablo Reko, and Reko sent them to Harvard University.[6] They arrived in bad condition, and all the mycologists could do was to identify them as belonging to the genus *Panaeolus.* They were definitely not an amanita. In 1937 and 1938 we find a botanist at Harvard, Richard Evans Schultes, and an anthropologist at Yale, Weston La Barre, publishing papers in which, at long last, they took direct issue with Safford.[7] It was Reko's insistence that led Schultes to review the classic Spanish authors.

In July 1938 Schultes with Blas Pablo Reko visited Huautla on a field trip. In the course of their collecting, they obtained mushrooms that were described to them as the divinatory species, and later Dr. David Linder at Harvard confirmed Schulte's identification: *Panaeolus campanulatus* Linn. var. *sphinctrinus* (Fries) Bresadola. There can be no question as to this identification: in 1956 a specimen, being still in existence, was sent to Paris, where Professor Roger Heim confirmed the earlier findings. Unfortunately, Schultes did not see the specimens consumed by a *curandero* performing his office, and because of the paucity of the mycological material collected, neither Schultes nor Reko ate the mushrooms while still in Huautla. Schultes states expressly that "in my two visits to the Mazatec country narcotic mushrooms other than *Panaeolus campanulatus* var. *sphinctrinus* were not found in use in divination," but from natives' reports, he was confident that other species and even genera were current.[8]

Some time later Dr. Rolf Singer, going over Schultes' collections, recognized among them a specimen of *Stropharia cubensis* Earle, which he chose to call a *Psilocybe*, and on the strength of Schultes' field notes, Singer in 1951 included a single sentence in his comprehensive work on the Agaricales, reading as follows: "At least one species [of *Psilocybe*] is used as a drug in Mexico (causing a temporary narcotic state of hilarity) but is poisonous when used in excess."[9] How near Singer came to a major discovery! Unfortunately he failed to identify the species, nor did he link its use to particular ethnic groups in Mexico's heterogeneous population, nor did he dwell on the religious role played by the mushroom and its application in the daily life of the Indians. The mushroom is anything but a narcotic, and there is yet no proof that it can have deleterious effects. Singer left his readers in the dark as to whether his provocative sentence was based on his personal observations. The fact is that he failed to follow up his hearsay information until after Dr. Roger Heim and we had published our findings, whereupon in a matter of weeks he hurried from Tucamán to Oaxaca, and there in the field we first had the pleasure of encountering him in July 1957.

In Huautla Schultes and Reko ran into another field party. The promising young anthropologist Jean Bassett Johnson was there, accompanied by Bernard Bevan, Irmgard Weitlaner (daughter of Robert J. Weitlaner), and Louise Lacaud. Johnson's party succeeded, on the night of July 16, in attending the mushroom ceremony, which Johnson later described in an anthropological paper published in Sweden.[10] There was no singing and apparently no member of Johnson's party was invited to share in eating the mushrooms. The divination rite was the one in which grains of corn are cast and interpreted. In 1953 we witnessed the same rite, this time with Weitlaner, and we are in a position to confirm Johnson's account.

The secret of the divine mushrooms seemed about to be discovered when World War II supervened. Johnson was destined to lose his life in it, and Schultes was diverted for many years to the upper Amazon to work on the native rubber of that region. Since the war, apart from our expeditions, there has been little to report. In 1945 Blas

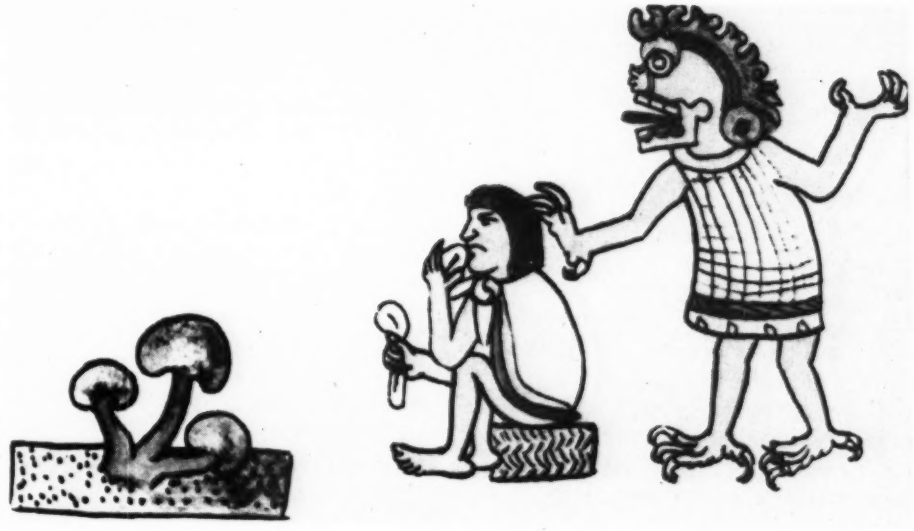
The adoration of the mushroom. María Sabina, *curandera* of the Mazatec village of Huautla de Jiménez, worshipping the mushroom before she eats it in the course of the mushroom rite.

Pablo Reko published his *Mitobotánica Zapoteca* in which he reiterated his belief in the mushrooms, recorded their use among the Indians of the Mazatec, Chinantec, and Zapotec tribes, and made bold to guess at their identity. Dr. Reko died in 1953, an honest, diligent, enthusiastic worker in the fields of anthropology and ethno-botany, whose contributions never carried conviction because of his fantastic theories and bad philology. His cousin Victor had died some years earlier. In 1954 there appeared in Mexico City a small volume, *Las Plantas Fantásticas de México,* by F. Guerra and H. Olivera, an uncritical and incomplete compilation of earlier authors, in which Schultes's mushrooms occupied first place.

All these details of ethno-mycological history, when spelled out as we have done it, sound more impressive than they are. The essential documents about the hallucinogenic mushrooms can be read in an hour: the quotations from the old writers, Johnson's report, and Schultes's papers.

We had been pursuing our inquiries into the role of mushrooms in the cultural history of the Old World for many years. We had found indications in the etymology of the names of mushrooms and in folklore, as well as in contemporary attitudes toward "toadstools," that at one time mushrooms had played a part in our ancestors' religious beliefs. At this point, in September, 1952, in almost the same mail, we received two communications, one from Robert Graves in Majorca and the other from Hans Mardersteig in Verona, alerting us to the peculiar place of mushrooms in the Meso-American cultures. We had known nothing before then of the indigenous cultures of that region. Quickly we got in touch with Gordon Ekholm of the American Museum of Natural History and Richard Evans Schultes of the Botanical Museum at Harvard. Schultes told us to communicate with Blas Pablo Reko, who passed us on to Miss Eunice V. Pike of the Summer School of Linguistics, and then died. Miss Pike, a student of the Mazatec language, had lived in the Mazatec country off and on for many years, and she proved of invaluable help in guiding our footsteps. Meanwhile we assembled what little had been written on the subject.

To make a long story short, we have



Top. The "idolatry" of the mushroom, through the eyes of the sixteenth century Spanish illuminator. From Florentine Codex of Sahagún.

Center. An Indian's conception of the mushroom. The God of the Underworld speaks through an Aztec who is eating the mushrooms. From Magliobecchiano ms.

Right. "Mushroom stones." Two examples of earliest type of Highland Maya stones. Left, a frog or toad associated with "toadstool;" right, a jaguar with geometrical design. These stones date from B.C. 500 to B.C. 1500.

This mushroom, *Psilocybe mexicana* Heim, and the mushrooms on page 5, are used for divination in Huautla.

visited the Indian country of Mexico every year since 1953, especially the hill country of Oaxaca and the Valley of Mexico. By now we have attended many sessions conducted by shamans in which mushrooms have been used. We were able to confirm Johnson's observations of 1938. We were the first to attend a *sung* performance, lasting most of the night. We were the first to eat the mushrooms, which we have now done on numerous occasions, in the course of the rite and by ourselves. We were the first to report in detail our experiences, including an account of the hallucinations that the mushrooms cause.[11] Thanks to the brilliant work of our photographer, Allan B. Richardson, we were able to get a complete photographic record of the rite, and were first to record the event on tape, which is now available commercially.[12] Most important of all, we were able to enlist the cooperation of Professor Roger Heim, dean of French mycologists, who came to Mexico with us in 1956 and fixed the identity for the first time of seven kinds of mushrooms that are used for divination, belonging to three genera. Four of them are species new to science, two of them are new varieties of a species already known, and the seventh is a species first described by Earle in 1906, from specimens found in Cuba. Professor Heim has duly announced his discoveries in *Comptes rendus* submitted to the *Académie des Sciences* and published also in the *Revue de Mycologie*.[13]

Unlike Schultes and Weitlaner, we failed to find a *Panaeolus* in use for divination, and three *curanderos*—two in Huautla and one in Yaitépec, Distrito de Juquila — rejected the var. *sphinctrinus* when we submitted it to them. They sniffed at it, tasted it, and said no. But let us not jump to conclusions. The psychogenic effects of certain species, of *Panaeolus,* until now not firmly identified, though distinct from the effects of our species, are well supported in mycological records. Furthermore, in the indigenous cultures of Mexico, where the cultural heritage is preserved solely in the oral tradition and the use of the mushrooms is surrounded by secrecy and steeped in *mana,* there appear to be different traditions in every tribe, and within the tribe in every village, and even family traditions within the village handed on from parent to child in the *curandero's* family, with different names for the mushrooms, different tabus, and different practices (in some respects) in the ritual. Not all the mushrooms that we found in use among the *curanderos* of Huautla, for example, were known to all the *curanderos* in that town. While it is possible that Schultes's purveyors may have deceived him, either intentionally or unintentionally, it would not be safe to assert that this happened. *Panaeolus campanulatus* var. *sphinctrinus* superficially resembles *Psilocybe mexicana,* from which, however, it can be easily distinguished by smell and taste.

In the progress of knowledge, a certain interest always attaches to the reasons why a discovery is made at a particular time and place and by particular persons. Why was it that we, a pediatrician and a banker in New York, made an ethno-mycological discovery of some importance in Meso-America? Seemingly, nothing could have been further from our course. Why hadn't the mushrooms been previously identified and their hallucinogenic effects described, and why were they finally run to earth by us, of all people?

Mushrooms are the stepchild of science. They have never attracted their share of scientific talent. Thus it comes to pass that in Mexico where, for example, medicine has attracted many brilliant workers, until now there have been no native mycologists. Furthermore, the mushroom cult is an anthropological phenomenon, and one must be both anthropologist and mycologist to enter into the spirit of this thing. The foreign mycologists, who have made forays into Mexico, have not been equally interested in the anthropological aspects of their science. Not all of them are eager to eat the divine mushroom in a midnight communion. Yet for the study of the religious beliefs of Meso-America a willingness to participate in their secret ceremonies is essential. Spaniards and Englishmen by cultural inheritance are mycophobes, and the tabu that hangs over mushrooms is enough to make many mycologists of those nations retch at the thought of eating a detestable *Psilocybe.* The tabu is a living tabu and so much a part of their unconscious nature

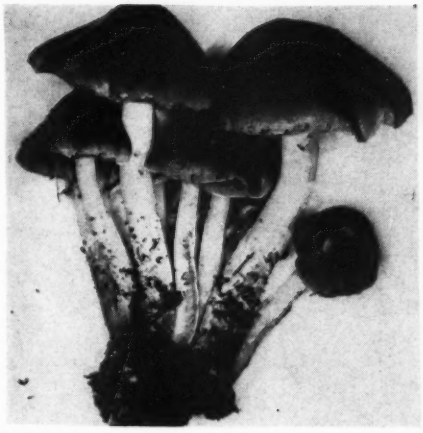
that it seems natural for them to have a stomach upset on consuming a mushroom, in the same way that an orthodox Moslem retches at the thought of eating pork. Yet, even so, Schultes and Reko were on the brink of the sensational discovery when the war interrupted their activities: one more field trip in the rainy season might have been enough.

We had been pursuing as an avocation our ethnomycological studies for more than twenty years, when we first learned of the religious role of mushrooms in Meso-America. We had made three field trips before we succeeded in breaking through the native reserve of the Indians and attended a sung service of the *curandera* María Sabina. At an early date we enlisted the interest of Roger Heim in our work. Professor Heim is the director of the *Laboratoire de Cryptogamie* of the *Muséum National d'Histoire Naturelle,* and he has concentrated his attention on the tropical fungi. He is also alive to the value of the humanities, writing with the grace of a man of letters. The scientist who is at home in humane letters is possibly more common in the Old World than the New. Moreover, Professor Heim is a mycologist *and* a mycophagist: in the field his collections for the *Muséum National* are rivalled by his collections for the skillet. (We shall never forget an omelette of *laqués* [*Laccaria laccata* (Scopoli ex Fries) Berkeley and Broome] that he prepared, on August 1, 1956, after a day's hard collecting, in the neighborhood of Yaitépec, near Juquila in the Chatino country.) From the beginning, he entered into our pursuit of the divine mushroom of Mexico with passionate interest. When we were ready for him, he joined us in the field. We hold that our meeting with Professor Heim was our greatest stroke of good fortune. He more than fulfilled the promise of our discoveries.

We have taken the first big step forward, but it is only a first step. As we advance, the horizons on all sides keep receding. The chemists must isolate the active agent, define its properties, give us the molecular structure,

Conocybe siligineoides Heim

and synthesize it. The medical investigators will study ways to utilize it, presumably as a tool in psychiatric research. The anthropologists of Meso-America will, ultimately, vouchsafe to tell us how widespread is the use of the mushroom, and pin down for each region the emotions and beliefs associated with it. Helped by the archeologists, they will say how deep into the past the cultural trait can be discerned. The mycologists have their hands full to classify yet other species that the Indians in Mexico may employ. Beyond all this, there remains the great question: how widespread was the diffusion among the world's primitive peoples of the hallucinogenic mushrooms, and what was their role in the origins of the religious idea? For we suspect that in the hallucinogenic mushroom we have hit upon one of archaic man's divine Mediators.



Psilocybe caerulescens Murrill var. *mazatecorum* Heim — the "landslide mushroom."

In the order cited the authors are:

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3. See e.g. the following:
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   Siméon Rémi: **Dictionnaire de la Langue Nahuatl,** 1885, under the entries **nanacatl** and **teonanactl.**

4. See "Peyote, the Narcotic Mescal Button of the Indians," Journal of the American Medical Association, Oct. 15, 1921.

5. Reko, Blas Pablo: **Mitobotánica Zapoteca,** 1945, published by himself, pp. 14, 44, 53, 95; El México Antiguo, Dec. 1919, vol. 1, No. 5. "De los Nombres Botánicos Aztecos," pp. 113-157, entry under **nanacatl.** We have not seen the letter but it is quoted in Schultes, Richard Evans: "The identification of **teonanacatl,** a narcotic basidiomycete of the Az-

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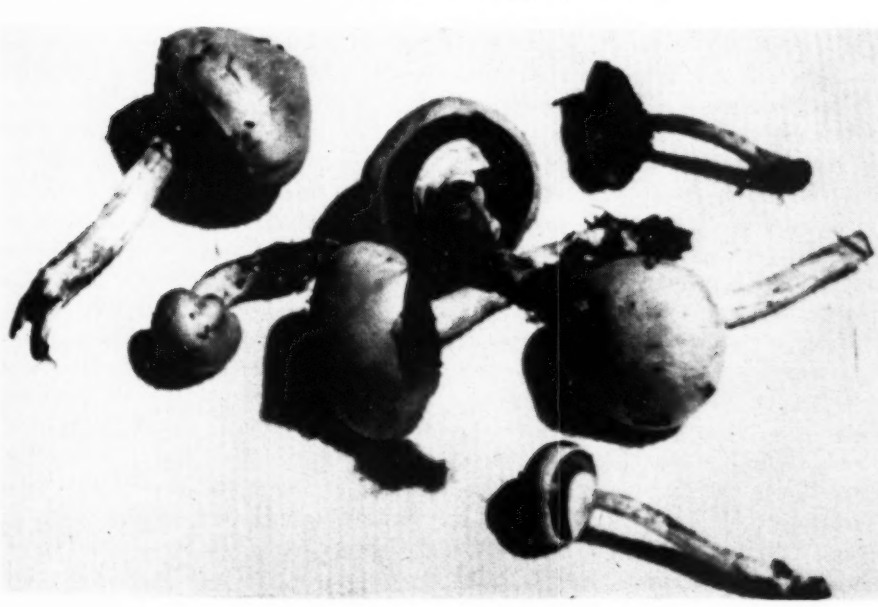


Stropharia cubensis Earle

The Lady Petre Pear tree near John Bartram's home. Picture taken in 1904

THE LADY PETRE PEAR TREE

By **Francis D. West**

READERS OF THE GARDEN JOURNAL who have followed with interest, as I have, the articles by Mrs. Winifred Notman Prince on "John Bartram and Thorndon Park" in the September-October and November-December numbers, may be interested in the following excerpts of letters that passed between Bartram and Collinson, and also to learn about the Lady Petre pear tree which was planted about 1737. The pear tree lived until the spring of 1931, about one hundred and ninety-four years, when it died and was removed. At the time there were three pears still clinging to it. I saw the tree in the early nineteen hundreds; it was then still in fair condition but showed signs of failing, some of the smaller branches were dead.

Lord Petre was first mentioned in Peter Collinson's letters to John Bartram in 1735-1736. Collinson wrote January 24, 1735: "I design to make a present of a part of those seeds to a very curious person. I hope to procure thee some present for thy trouble in collecting." On February 20, 1735, he wrote: "When I have settled with our noble friend who takes all cargo to his own account I will advise thee of the balance." On March 1, 1735: "My noble friend desires to continue the same collections send the same sorts over again and what new ones happen in thy way." Under date of March 12, 1735, Lord Petre is mentioned by name as Bartram's employer.

In a letter dated Sept. 12, 1739, Collinson, evidently in a reply to Bartram's question as to what to send to Lady Petre in appreciation for her interest and gifts, suggested a humming bird's nest with eggs.

Lord Petre was Bartram's best patron. Collinson wrote September 1, 1741: "The trees and shrubs raised from thy first seeds are grown to great maturity. Last year Lord Petre planted out about ten thousand Americans which, being mixed at the same time with about twenty thousand Europeans and some Asians, make a very beautiful appearance, great art and skill being shown in consulting every one's particular growth, and well blending the variety of greens, dark green being a great foil to the lighter ones and bluish green to yellow ones, and those trees that have their bark and back of their leaves of white or silver make a beautiful contrast with the others.

"The whole is planted in thickets and clumps and, with these mixtures are perfectly picturesque and have a delightful effect. This will give thee a faint idea of the method Lord Petre plants in which has not been so happily executed by any and indeed they want the materials whilst his lordship has them in plenty. His nursery being fully stocked with flowering shrubs of all sorts that can be procured, with these he borders all his plantations, and he continues annually raising from seed and layering, budding, grafting, that twenty thousand are hardly missed out of his nurseries.

"When I walk amongst them one cannot help thinking he is in North American thickets, there are such quantities. But to be at his table one would think South America was really there —to see a servant come in every day with ten or a dozen Pine Apples—as much as he can carry. I am lately come from thence quite cloyed with them. Thee will think I talk figuratively when I tell thee that his Pine Apple stove is sixty feet long and twenty feet wide and height proportionately and I further tell thee that his Guavas, Papaws, Ginger and Limes are in such plenty that yearly he makes abundance of wet sweet meats of his own growth that serves his table and makes presents to his friends. I never saw or tasted from Barbados finer nor better cured, but then these trees grow in beds in houses some twenty, some thirty feet high. It is really wonderful to see how nature is helped and imitated by art but besides his collection of West and East India plants is beyond thy imagination here. I must end because it is endless to mention the great variety of contrivances in his gardens to produce all fruits and plants in the greatest perfection."

Collinson wrote Bartram the day Lord Petre died, July 2, 1742: "I can't express the concern of mind I am under, on so many accounts I have lost a friend my brother. The man I loved and was dearer to me than all men is no more."

On December 18, 1742, Bartram wrote Collinson: "I suppose the death of our dear friend Lord Petre will discourage distant travels and our Americans have not zeal enough to encourage discoveries of this kind at their expence." Bartram had just returned from a trip up the Hudson to call on Cadwallader Colden. Fortunately, Collinson was able to interest others and later Lord Petre's son, the new Lord Petre, continued ordering through Collinson.

The Lady Petre pear tree is not mentioned in the correspondence until October 23, 1763, when Bartram wrote "I am heartily glad that young Lord Petre is possessed of the botanical taste of his father. I wish he may resemble him in Virtue. I have intended to inquire after him and his mother in every late letter.

"The pear raised from seed hath borne a number of the finest relished fruit, I think a better is not in the world."

To which Collinson replied on January 1, 1764: "It has been my patience to wait but my pleasure to hear of the delicious pear raised from Lady Petre's seed, but the dear lady has gone to rest.

"What I am pursuaded will prevent its dropping fruit, if some quinces were planted in the lower part of thy garden near the spring and graft them with the pear, it ameliorates the fruit. By experience all our pears are grafted on

(Continued on page 21)

Evolution of Gardens

By H. W. Rickett

Gardens Through The Ages

Once I was digging some wild plants in Wisconsin for transplanting to a garden in New York. It does not now matter what they were, only that they had attractive flowers and handsome foliage. My efforts occasioned much curiosity and some derision among the people of that place. "What did I want with those things?" I was asked, "—they're just weeds."

It proved impossible to convince these persons that all the plants of gardens were "weeds" once, or descended from weeds (if by "weeds" we mean, as they did, any plants growing without cultivation). If they gave a grudging assent to the principle, they could not admit that *those* weeds, so familiar in their own roadsides, could ever be of any value. Yet their own crops, not to mention their few ornamental plants, came from plants which grew wild without human attention.

Most of the history of cultivated plants is lost in the dim ages before man made records of his life and achievements. Some human creature, perhaps going clad in skins and armed only with rough implements of wood and stone, once took the unprecedented, highly imaginative and, to his fellows, probably astonishing and ridiculous step of transplanting a wild grass or its seed or a young fruit tree to a place near his dwelling and watching over its growth; supplying it with water, keeping it from being submerged in the rank growth of unwanted plants; subsequently harvesting a crop for his private use, to the envy of the tribe. This may have happened a hundred thousand years ago, or more. It may have happened many times, in different places, with different kinds of plants. In historic times it has happened again and again, and the process still continues. Indeed, what we know as civilization was probably impossible until man learned to grow his food in places of his own choosing, rather than having to hunt it or pasture it. All our cultivated plants—those of our gardens as well as those of our fields and orchards—are descended from wild ancestors; of that there can be no doubt. But through the long march of the centuries such changes have occurred in them that we can form no sure concept of what those ancestors were like; and they themselves have apparently vanished from the earth.

Perhaps man's first efforts at domestication were magical in his view rather than purely a matter of food. Certainly, he very early developed a religious feeling for plants, particularly trees. Paintings on old Egyptian tombs show offerings made to trees. Abraham "planted a tamarisk tree in Beer-sheba, and called there on the name of the Lord . . ." In Hellas trees were inhabited by dryads and other nymphs. Groves of oaks were sacred to Zeus, and the olive was Pallas' tree. Even now, once a year we decorate trees in a tradition that began as a religious observance.

When trees were planted in groves, they were surrounded by walls, doubtless to keep thieves out and perhaps to exclude also the hot dry winds of a surrounding desert. This occurred in Egypt, many thousands of years ago; and in Persia at a later time; and eastward around the Mediterranean; and again in Europe after the fall of the Roman Empire. And man, having thus created an orchard, an ort-yard or ort-gard, a place where plants are enclosed, found that he had also made for himself a pleasant place in which to escape the heat of the day and in which to walk in the cool of the evening.

Walled gardens existed in Egypt for many centuries as a mixture of use and pleasure, with some religious feeling still adhering. Of course water was a requisite, a spring or a stream, usually collected in a pool or tank in the center. Various crops were planted under and around the palms, grapevines, and sycomores: onions and radish and cucumbers and peas. And other plants were grown purely for ornament: roses, poppies, anemones, cornflowers. All these had been domesticated from wild-growing plants, long before.

Such gardens were the property of kings and their nobles—councillors and warriors. In them they lived with a numerous population of wives, sons, daughters, servants, slaves. The palace of Alcinous, of which we read in the "Odyssey," must have been a fair example of this early type of civilized settlement, in which the garden of the chief or lord was the focus. As the Greek city-states developed, as democracy replaced the patriarchs, gardens became public instead of private. Plato taught in a garden given to Athens by Cimon and called the "Hekademeia" in honor of a noted athlete (our translation of the name is academy). A museum was a grove sacred to the Muses.

Private gardens came in again with the luxury of Rome: the villa was a symbol of the wealth and power of the patricians. In it—more even than in the homes of the wealthy Egyptians—gardens were developed as works of art, for pleasure in the sight of beauty. They were usually surrounded by the colonnaded halls which gave on the living quarters, they were adorned with marble figures and with shrubberies cut into formal shapes, they contained many flowers—violets, delphinium, lilies, crocus, and others.

The barbarians put an end to this: the Goths, the Angles and the Saxons, the Franks and the Germans and the Vandals, and many other tribes. Roman culture survived here and there and was gradually assimilated into the new order. When a brotherhood (or sisterhood) of Christians abandoned the disturbed world and took up their lives in a house deserted by its former owner, they set the pattern of the great monasteries of medieval Europe. Life in these foundations centered in the cloisters, covered arcades of stone surrounding a central garden: the transformed villas of the Romans. In the gardens thus preserved grew not only potherbs for the refectory and healing herbs for the infirmary but also lilies and roses to grace the altars, and, in the luxuriant grass, the flowery mede of northern Europe, daisies and violets and other small flowers. Naturally the religious element was strong here; everything grew for the glory of God. Lilies symbolized chastity and roses Passion, violets stood

for humility, iris for the royal blood of Jesus; and so on.

Elsewhere around castles and towns the fields were yearly trodden by steel-clad men and horses. The orchards and gardens, at first enclosed by rude fences of wattle, were taken when possible within the walls of the castles, compressed once more into a form like that of the first walled gardens. In these cramped quarters they provided the lords and their ladies with lawns and arbors, the latter furnishing both shade and fruit. Water splashed from fountains beautifully wrought of iron, carnations in pots stood primly under the battlements, and the fire-step for the archers, or later the musketeers, was covered with flowery turf on which to sit. Such flower beds and herb gardens as they had were laid out in rectangles, enclosed in boards which held them above the level of the walks.

In that period of re-awakening which we call the Renaissance, civilization escaped again from walls; cities grew; great country estates flourished; wealth brought luxury and a measure of freedom. Gardens spread into parks, terraced and hedged and arbored, with careful gravel walks in floral or geometrical patterns, with vistas and avenues and statuary and fountains. One may still find such gardens—public and private—in Europe. In England wealth and power were, on the whole, less concentrated; a profusion of flowers adorned the cottages of the poor; and the gardens of innumerable small estates were less formal and more colorful. It is above all from English gardens that the gardeners of North America drew their inspiration. Here informality marks suburban gardens as well as vast estates: flowering borders and shrubs and trees are set irregularly around green lawns.

But the wealth of plants which we now enjoy is something new. In the gardens of the subjects of the first Elizabeth were no rhododendrons or azaleas, no gladiolus, no chrysanthemums, no nasturtiums, no dahlias; in their houses grew no pelargonium, no begonia. There were snapdragons and lupines, daisies and carnations, lilies and roses, pansies and iris and poppies; the cottage gardens of rural England have not changed very much. But our modern horticulture derives from South Africa, from Turkey, from China and Japan, from Australia—from all the world, in fact. The history of gardens since the seventeenth century is, first, the story of explorers, botanists and others who went in search of new plants; and second, the improvement of the plants by cultivation and the origination of thousands of new kinds which never grew on earth before—and could not long survive if left to themselves.

The Geography of Gardening

The first settlement by Europeans in South Africa was in 1652. By the end of that century hundreds of "Cape plants"—from the Cape of Good Hope—were flourishing in England and Holland: pelargonium, chinkerichee, amaryllis, calla lily, gladiolus, freesia, clivia, aloe, stapelia. It is with something of a shock that we realize that such familiar plants, the elementary materials of our gardening today, were not always so—that many of them were the *weeds of other lands* a scant two or three hundred years ago. In the eighteenth century the Royal Botanic Gardens at Kew sent Francis Masson to South Africa especially to collect new plants for English gardens and greenhouses. He returned in 1795 with no less than four hundred new species, and these included forty-seven kinds of pelargonium.

Even before this the Emperor's ambassador in Constantinople had spotted a plant that took his fancy in Turkish gardens. It had been quite recently domesticated by the Turks; they called it by their word for a turban, because of its fancied resemblance to that headgear: *tulipam*.* The diplomat brought it back to Vienna, and by 1600 it was growing in the gardens of England and Holland. Thirty-five years later fantastic prices were being offered for new varieties. The tale of the speculation in bulbs, which occurred during the "tulipomania" in the low countries, makes some of our "booms"—such as that in real property in Florida during the nineteen-twenties—look quite small.

One of the ships of the East India Company in 1701 carried a surgeon named James Cunningham. He returned from China with gardenias and several fine new coniferous trees—including the one later named for him, *Cunninghamia*. About a hundred years later another employee of the same company, John Reeves, sent back to the infant Royal Horticultural Society azaleas and camellias, chrysanthemums, peonies, wistaria . . . In the middle of the nineteenth century the great Robert Fortune collected for the Society; his "take" reads like a modern nurseryman's catalogue—species of clematis, of rhododendron, of forsythia, of lilac, of flowering crabs and cherries, and many others. The search for plants of Asia has continued into modern times. From Japan we got a new race of iris and the gold-banded lily—to name but two of the many gifts of those islands. Ernest Henry Wilson, who died only the other day, collected first for Kew and later for the Arnold Arboretum; one of the best of his finds was the regal lily from the borders of China and Tibet.

John Gould Veitch, one of the famous firm of nurserymen of that name, collected also in the South Seas and in Australia. Allan Cunningham had gone from Kew to New South Wales in 1816 and to New Zealand in 1826. Australian plants, however, were unsuited to the grey skies and low temperatures of northern Europe. Many would do well in the southwestern United States, but have been strangely neglected there—except the groves of eucalyptus and araucaria.

Cunningham was also in Brazil and was followed in South America by a host of collectors; Central America and Mexico also yielded their treasure—of a kind which the Spaniards had not coveted. Where should we be without begonia and poinsettia, nasturtium and fuchsia, bougainvillea and nicotiana and hippeastrum, cattleya and laelia—to say nothing of the humble potato and its cousin the tomato? We have drawn from the whole world even for our "house plants" and our suburban "yards," as we have also for our fruits and beverages. The few "old-fashioned" flowers of ancient gardens have been joined by a brilliant host from overseas and from the other side of the earth.[1]

(Continued on page 36)

*I have found this word spelled also tulbend, tulband, tuliband, dulbend, dulban; the ambassador may have heard it in some local dialect. There are other but less authentic tales of the introduction of the tulip to Europe.

1 From the examples of plant collectors I have mentioned, the reader may draw the mistaken notion that the development of modern gardens has been entirely the work of the English. This, of course, is far from the truth. All European

A COUNTRY PROPERTY

For Maximum Pleasure with Minimum Maintenance

By Alice L. Dustan

HOW CAN YOU OWN several acres, yet find time to sit down and enjoy your views? The secret, we are convinced, is to concentrate garden areas near the house, then develop controlled views from them.

As example, we should like to introduce to you one of the finest country properties we know—that of Mr. and Mrs. Robert C. Bourne on the outskirts of Morristown, New Jersey. The Bournes' land comprises eleven acres, of which about three are under intense cultivation.

The rectangles of courtyard, terrace, green garden and lawn, plus the straight lines of walks and walls, suit the Georgian style of the Bourne house. Each area offers a view to woodland or to meadow and distant hills.

Sometimes transition is sharp—as between green garden and woodland directly behind it. On the other hand, it may be so gradual as to seem imperceptible — as where shrub-edged allée connects house lawn and meadow. But always the view is controlled to make the most of natural surroundings, both on the property and beyond it.

The basic scheme for the gardened area was worked out by Mrs. Bourne herself, about ten years ago, soon after the house was built. She has also developed the garden details and the transitional plantings which make the results so notable.

The Bourne house was built on the highest ground. It is reasonably near the road, yet screened from it by a thick stand of black locust and ash trees.

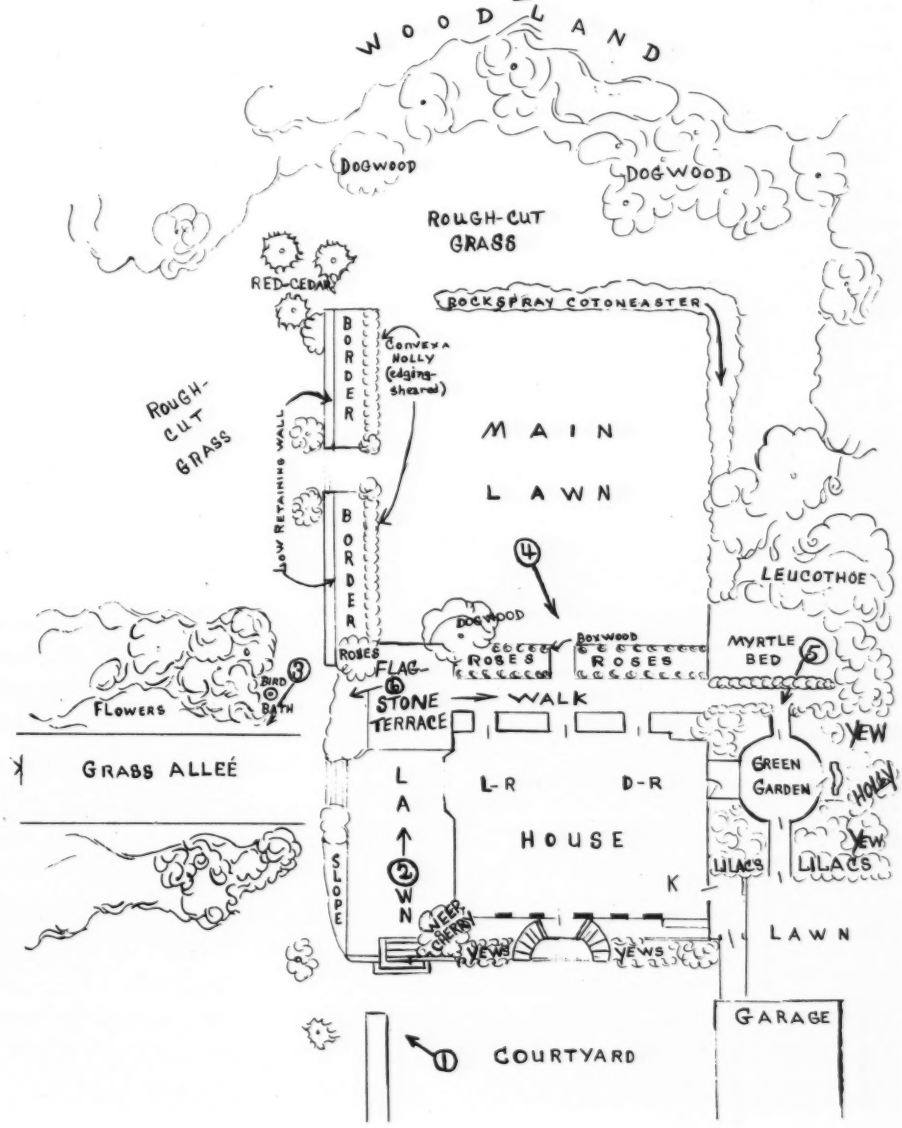
The approach driveway curves pleasantly through the woodland, to bring you into the courtyard opposite the central door of the trim brick house. Attached by covered walk, a triple garage unobtrusively makes a third side of the square courtyard, a generous fifty by fifty feet. The fourth is formed by a low open-brick wall, which partially screens off the lower lying vegetable garden and emphasizes the meadow view beyond.

The foundation planting for the brick house is simple, yet strong. Yews flank the steps curving down from the doorway; they are supplemented by dwarf wing-bark euonymus. Single yew specimens repeat behind the adjacent open-brick wall, near which a handsome sourwood tree stands. A weeping cherry softens the high corner of the house; below it, a pair of rockspray cotoneasters flank the brick steps.

Access to house lawn and gardens is by these steps and across a small lawn in front of the large living-room window from which you look down the shrub-lined allée. The main terrace, built of large slabs of flagstone, is located off this southeast corner of the house, both for air circulation and to take in views of garden and meadows below.

A quick look around from this point shows that the gardened areas about the house are all on one level. Most of them are sharply defined—by low retaining wall, by shrub-filled slope, by hedge, or by the house itself.

Thus, the shallow slope above two



1. COURTYARD CORNER. Steps at right, which lead to main terrace, past living-room, are flanked by rockspray cotoneasters. A weeping cherry stands at far right, against house corner. Open brick wall, at left, helps hide vegetable garden, yet preserves distant view to meadowland and hills. Black locusts and wild cherries are among native trees which have been retained for shade and beauty of outline against the sky.

sides of the lawn has been filled with a row of rockspray cotoneaster. This satisfactory planting serves to illustrate how well details have been solved about the house.

Trailing roses were first tried in this area—and rejected. They got too rampant and untidy. Dwarf campanulas did not do either. They were not important enough, and they tended to creep into the lawn. While small plants of cotoneaster have taken two years to establish they prove to be the "exactly right" plant for this slope, which is backed by dogwoods edging thick woodland. These low shrubs blend well in texture with others adjoining the lawn —especially the larger spreading cotoneaster and the convexa holly and boxwood edgings.

A happy solution in herbaceous plants is that of coral-bells to fill spaces between compact little English boxwoods. This combination edges the rose beds located on the outside of the walk paralleling the south side of the house. The leaf rosettes of the coral-bells always look trim, and their delicate flowers fill in below the rose blooms in June. Across the path, magnolias espaliered against the south wall of the house offer very early spring bloom.

Again, after trying spring bulbs and astilbe in the little green garden, and rejecting them because their foliage tends to turn shabby when the brick terrace is in use, Mrs. Bourne has found a satisfactory native groundcover in the Christmas fern. In the sunnier foreground areas, myrtle supplements this evergreen fern. All shrubs are fully evergreen, too, to allow for year-round enjoyment.

A feeling of intimacy characterizes the green garden, with its crisp plants and small area enclosed by wall and hedge. In marked contrast is the main terrace, on the other side of the house, with its spacious views to garden and distant landscape.

Bringing one of the best views into focus is the adjacent wide grass allée. This axis from the living-room window focuses on a handsome group of columnar red-cedars far down in the field below. Shrubbery groups flanking this allée have been skillfully worked out to join cultivated areas with the natural landscape.

Shrubbery bordering the allée includes native plants — many collected on the place—interwoven with foreign shrubs which blend in character, yet introduce more seasonal color. Added to the foreground, a few tough perennials complete these plantings.

Dogwood and lilac highlight these borders in May. They are succeeded by the bloom of beautybush and hugonis rose, with peonies and iris in the fore-

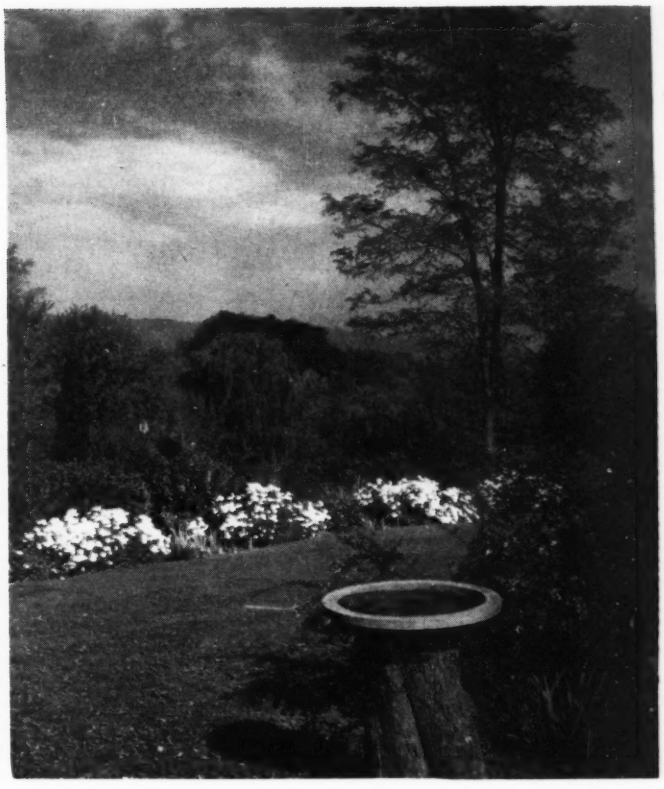
2. THE MAIN TERRACE. The flagstone terrace receives afternoon shade from a dogwood, carefully preserved when the house was built. Looking toward the lawn, a desirable long view is caught of the main flower borders, terminated by a group of native red-cedars. A dry wall takes up the change in level between border and rough grass below it. Rockspray cotoneasters fill a low slope beyond the level manicured lawn.

ground. In midsummer, flowers of native clethra, white rugosa rose and abelia are accompanied by those of lilies, such as the Bellingham hybrids, and day-lilies, mostly yellow ones but a few in deeper shades. ("The best thing that has happened to gardens in midsummer!" is Mrs. Bourne's enthusiastic comment about the day-lily hybrids.)

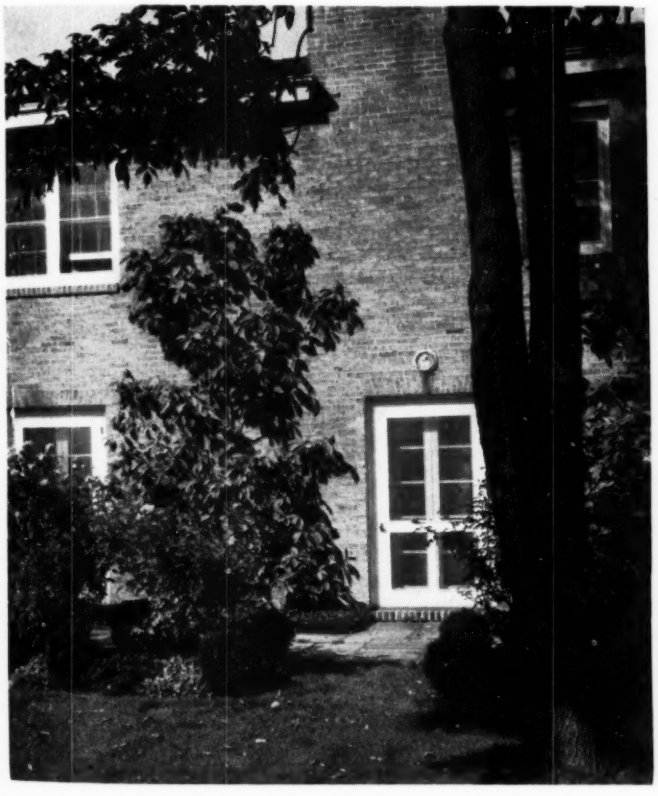
The main flower border has been quite a problem, the owner confesses. Not only do deer and mice discourage the planting of some favorite perennials and bulbs, but the width of the border —five feet—seems too narrow for much attempt at succession of bloom. Consequently, color has been worked out for June and later, when the adjacent terrace is in use.

The June combination features salmon varieties of oriental poppy. These are supplemented by that "common but effective" naturalized purple bellflower *(Campanula rapunculoides)*, by purple Siberian iris, yellow thalictrum, some lupin, columbine, and yellow day-lily.

As in every attractive garden in which the owner takes a personal interest, minor improvements are always being made. For example, even since these photographs were taken, the miscellaneous groundcovers below the retaining wall have been cleared out to make way for a grouping of low white azaleas, the 'Delaware Valley' and the taller 'Wilhelmina.' Should blue mist *(Caryopteris)* be introduced between to give summer color? Mrs. Bourne is going to try it.



3. BIRDBATH AND VIEW. The fourteen-foot wide grass allee, across which this view was photographed, is bordered by informal shrubbery, supplemented by a few tough perennials for seasonal color. Such shrubs as pyracantha, inkberry, bayberry, wing-bark euonymus, and junipers furnish fall and winter interest. Spring bloom starts with lilac and dogwood; next come beautybush and shrub roses. Summer bloom is provided by clethra and abelia.



4. SIDE PATH AND ROSE BEDS. Edged with boxwood and coral-bells, bedding roses give summer color on the outer side of the flagstone walk. This walk connects the main terrace with the green garden, hidden around the corner. Espaliered saucer magnolias bloom extra early against this warm side of the house. The ash tree, which existed when the house was built, gives desirable high shade.

No "tour" of the Bourne property is complete without a visit to the work area, hidden behind the garage. Here three large compost heaps, each started a different year, lie in the shallow pits to keep the material moist and hasten its decomposition into useful compost. The adjacent tool house was once the contractor's shed, left after the house was built.

Care of the plantings is quite carefully divided. Mrs. Bourne takes entire charge of her flower borders, roses, and groundcover areas. Mr. Bourne, a busy commuter, confines his efforts largely to the vegetable garden. A maintenance man spends about eight hours a week mowing the lawn and doing such heavy work as transplanting shrubs and spading the medium-heavy soil. Upkeep of woodland and shrub-dotted field is negligible, consisting of destroying unwanted locust, soft maple and cedar seedlings during the winter months.

(Additional photographs on page 12)

5. Above. THE GREEN GARDEN. Tucked behind the dining-room conservatory, this small terrace is sheltered from winds in winter, from sun in summer. Choice evergreens which make up its year-round greenery include boxwood, Japanese andromeda, mahonia, Juliana barberry, and American holly. The paved circle is of brick, and brick forms the sawtooth edging of the gravel paths. A sheared lilac hedge hides the kitchen entrance in summer, when this terrace doubles as a dining-room.

6. Left. BELOW THE TERRACE. With old apple stump as pedestal, a bird-bath points up the transition between highly cultivated terrace area and naturalistic surroundings below retaining wall. Shrubbery borders were started with dogwood, blackhaw, and blueberry, all found on the property. Other naturalistic shrubs have been added. Low azaleas are being introduced to supplant miscellaneous groundcovers in the foreground.

Growing Holly in Containers

By **Ray R. Hirt**

From the talk given by Dr. Hirt at the Twenty-third meeting of the American Holly Society, November 7-8, 1957.

SOME YEARS AGO I was present at a horticultural society meeting in New York City and saw a small potted American holly plant on display. That sparked my interest in holly. Since then I have been growing various American and exotic hollies indoors and out-of-doors in Syracuse, New York. Of course, I cannot grow such beautiful specimens as you do. Low temperatures may cause excessive foliage drop in the spring, and early winter temperatures are almost sure to kill the adventitious shoots that start in late August and early September. Wet, heavy snows of late autumn and early spring always cause damage to broadleaf evergreens, and holly is no exception. So I must get much of my pleasure from trees of such relatively poor form that you probably would not retain them in your collection.

Hollies will not reproduce naturally from seed in our area, nor will newly rooted cuttings survive our winters. Therefore, I must grow my young plants indoors for at least a year in containers. I also secure new varieties from some of you who grow your saleable plants in containers, so I do have some first-hand experience with container grown plants, hollies included.

I am a forest pathologist. Plant pathologists have one peculiarity in common —they are always looking for trouble — plant trouble — and trying to discover the reason and the remedy. When some of my container-grown hollies failed to grow as well as they should after I set them out, I looked for a reason. From previous experience with container-grown plants and a study of these poorly growing holly plants, I concluded that the cause of poor growth was related to crippled root systems that had never recovered from the distorted growth caused by too small containers.

Aside from the function of anchorage, roots normally range for great distances in the soil, seeking ample moisture and essential elements necessary for good health of the aerial parts. The roots grow upward, downward, and outward in a pattern not too different from the trunk and its numerous branches. In the normal plant, each primary root extends itself outward more or less in a single direction, increasing in diameter, and living for relatively long periods. The primary roots send out secondary branches which, in turn, produce other branches, and so on and on. The smallest roots, which are concerned mainly with absorption, quite commonly are short-lived and replaced by younger roots. Thus under normal growing conditions the soil mass near a plant is thoroughly penetrated by the roots, but these roots form a pattern in which there is relatively little mechanical interference among the older long-lived roots. This is not true, generally, with artificially established woody plants, when the direction of root growth early in life is interfered with by impervious containers.

Foresters are quite familiar with the results of poor planting, and by poor planting, I mean particularly the kind that causes serious root distortion. A careless worker may pack the roots into a hole much too small to accommodate them. Such trees may remain dwarfed, become progressively chlorotic, and die prematurely. Sometimes they struggle along for fifteen, twenty, or twenty-five years and then develop trunk symptoms, and die rapidly. Thus, forest pathologists are wary of any practice that gets

(Continued on page 16)

PLANT PROPAGATION

A Discussion for the Keen Amateur

By James S. Wells

THE APPARENT intricacy and secrecy of methods of plant propagation have deterred many people from engaging in this activity which they have thought to belong exclusively to the skilled professional; but an interest in plant propagation is the sure sign of the mature plantsman, and there are at this time many excellent publications which can give to you, the keen amateur, first-class information and advice. Yet you may have received the impression that, even though the books and the writers tell you what to do, the whole thing is impossibly complicated, and you doubt very much whether you can achieve any measure of success.

In this discussion I hope to show that the many modern aids to successful propagation are not as confusing and conflicting as they appear to be at first sight. I can hear you say, "Ah yes, but this man has no idea how completely bewildering the mention of 'mist' and 'hormones' and 'rooting mediums' and 'timing,' and the type of cutting, and so on, ad infinitum, can be to the uninitiated grower." Indeed I can, and it brings us to the first important point with the would-be propagator, and that is the absolute necessity of making a start, even though you may not be sure just how to do it, or whether the plants will grow. Whether you try seeds, cuttings, or grafts, it matters not—but do get going! Because only in this way will you really gain that measure of interest which is essential to success, and only in this way can you also acquire the first-hand knowledge which is so much better than any that you can obtain from articles or books.

THE PROPAGATING STRUCTURE

Let us suppose that you have decided you will root some cuttings. How should you start? What procedures should you follow? What equipment do you need? Well, of course, the simplest piece of equipment is an up-turned jam jar, and I'm sure that many a keen gardener has rooted a few rose cuttings in this way. I mention this because the conditions which are maintained under the jam jar are essentially those required for any type of propagation, large or small. But the best equipment for you to use in the beginning is a simple frame. This need be nothing more complicated than an old window that has been removed from the house in some rebuilding operation, or a similar glass-filled unit purchased from the local builders' supply merchant. A proper horticultural sash, which would measure three by six feet, is ideal, but any glass-filled frame can be used. The base can be of wood, but cinder blocks are better; they provide a greater degree of insulation from extremes of heat and cold. It is an advantage to place the frame against the wall of the house, because the protection of the house provides some alleviation from the extremes of winter weather. But more important than this, it enables you to pop out from time to time, when you have only a few minutes to spare, to inspect your crop and see that all is well.

BOTTOM HEAT

Let us assume that you have made a frame from two standard sash and that it measures six feet square. You now have to consider a supply of bottom heat which is almost essential for the successful rooting of many cuttings. The six by six frame is very conveniently heated with one loop of the new plastic-covered electric heating cable, and if this cable is placed into the bottom of the frame, spacing the wires about five to six inches apart, the cable will maintain a bottom heat of about sixty-five degrees throughout the winter. The cost of running this single loop will be about two dollars a month. If you cover this heating cable with about five inches of rooting medium, no thermostat is necessary. It can run continuously, and the depth of the rooting medium will automatically control the temperature to about sixty-five degrees. The temperature will have to be watched carefully only in the spring as the weather begins to warm up, and probably at that time your cuttings will be well rooted and the cable can be disconnected.

THE ROOTING MEDIUM

What medium should you use for rooting cuttings? In most instances, the best medium is sharp sand. What do I mean by "sharp sand?" I mean sand which is coarse and rather gritty, and looks somewhat like the old-fashioned brown sugar which our mothers used for cooking. A finer plaster sand, which is usually available from the local builders' supply merchant, is satisfactory but not as good as the coarse sand, for the coarse sand provides good drainage which is essential for the rooting of all cuttings. Fill half of the frame with this coarse sharp sand, and the other half with a mixture of half sand of a similar type and half acid-type Dutch peat (pH of about 4.5). Shred this peat carefully so that it is finely divided, add an equal amount of sand to the pile, and turn a number of times to be sure that both are thoroughly mixed. Fill the frame to a depth of about five inches with this mixture. One point of caution. It is not necessary, nor even desirable to firm down thoroughly this rooting medium, as many old-fashioned books on plant propagation tell you. Simply place the medium in the bed with a shovel, level it off with a piece of wood, and let it be as it falls into place.

USING THE FRAME

You are now ready to take some cuttings. How should you begin? There is practically no limit to the type of cuttings which can be rooted in a frame of this kind. At this time of the year,

January-February, cuttings of rhododendrons, hard wood of deciduous flowering shrubs such as forsythia, and a host of other items can be taken. Rooting will be somewhat slow at this time of the year and may not be completed until late in the spring. A second batch can be made from soft wood material during June and July. These, in turn, can be removed and a larger batch can be put in in September-October, which is the best time to make most cuttings.

A frame of this kind can also be used early in the spring for the germination and establishment of seedlings of various plants. It is a simple matter to raise a batch of tomato seedlings in such a frame, sowing the seed about the first of March directly into pots, two or three seeds to each. Plunge the pots into the rooting medium, water in well, and as the seedlings develop, thin them out to one sturdy plant in each pot. These can then be set out into the open garden early in May, and you should have an early crop of fruit. The same procedure can be used for asters, zinnias, snapdragons, ten-week stocks and, in fact, almost any kind of flowering plant that you can name. The only limitation is one of space.

Timing Is Important

But let us revert to cuttings, because this is really the most fascinating form of propagation and one which you will no doubt wish to exercise at once. Timing is important, for it has a direct bearing upon the success of your operations. The best timing is determined by referring to the excellent books on plant propagation—or from personal experience. In general, cuttings root best when you take them from semi-mature or mature wood, unless you are taking soft wood summer cuttings.

Type Of Cuttings

A large cutting roots more easily than a small one. Now what do I mean by a large cutting? Well, let us take as a typical example American holly *(Ilex opaca)*. If you take a cutting which is six to eight inches long from a vigorous terminal shoot, whether the shoot be on a side branch or the top of the tree, this cutting will root more rapidly and with a larger root system than will a cutting made from the same branch but using a small side piece, which is about half the size of the terminal shoot. Both will root, but the larger cutting will root more readily and more vigorously. Generally speaking, I like to make cuttings of almost all kinds about six to eight inches in length, and from fairly stout wood. There are one or two exceptions, mainly in the soft wood summer cuttings which have to be taken smaller in size because the shoots are not mature. But for evergreens, in particular yews *(Taxus)*, the arborvitaes, the chamaecyparis *(Retinospora)*, medium large cuttings, six to eight inches long, are best. Most of these should be inserted in the plain sand, as should the flowering shrubs such as forsythia and spiraea. However, certain plants, such as the viburnums and firethorn *(Pyracantha)*, and all of the peat-loving plants, such as rhododendrons, azaleas, camellias, should be inserted in the section where the half peat and sand mixture has been placed. The individual preference of plants for certain rooting mediums is recorded in a number of publications, and if you are in doubt, by all means check before making the cuttings. However, if you cannot find reference to the plant with which you are working, then place the cuttings in the plain sand, and put a few in the sand and peat mixture as a test for your own enlightenment.

Aids To Rooting

We now come to one or two practices which increase the vigor of the cuttings and speed rooting. The first is "wounding" the cuttings. The wound can be applied in two ways. The first, a light wound, is made by drawing the tip of the knife blade down to the base of the cutting for a distance of about one and a half inches, cutting through the outer bark into the inner soft tissue. The second, a heavy wound, is made by removing a thin slice from the base of the cutting with the knife blade, cutting through the outer bark, and revealing the inner tissues, but not cutting right through to the woody center of the stem of the cutting. This heavy wound is particularly valuable on rhododendrons, camellias, and other plant material which you will place in the sand and peat medium.

Immediately following wounding, the cutting should be treated with a hormone powder which can be purchased from your garden store. Hormone powders are available in three strengths and come with complete instructions which you should follow exactly for best results. After being treated, the cuttings should be inserted in the frame to a depth of about three inches. If you make a cutting six to eight inches in length, then slightly more than one-third of the cutting should be in the rooting medium, and the base of the cutting should be about two inches above the heating cables. The cuttings will be inserted with a dibble, which makes a small hole in the rooting medium; the cutting is placed in the hole and gently firmed into position. It is not necessary to pound the medium to make it completely hard, nor is it necessary to pound the cutting in after it has been inserted. However, it must be properly held in place. The cuttings can be set quite close together so that the leaves are practically touching or, in some instances, overlapping. Large leaves, such as rhododendron leaves, can be reduced to about half their size in order to get more cuttings in the space.

Immediately after the cuttings have been inserted, they should be *thoroughly* watered in; this is the "secret" which eliminates the need of heavy pounding and firm planting of the cuttings. If the medium is thoroughly watered around the cuttings after they are inserted, then the medium is firmed and washed around the base of the cutting so that there are no air-spaces and the cutting is completely in contact with the rooting medium.

Under normal circumstances, light shade from direct sunlight is essential. The cuttings should not be subjected to direct sunlight even in mid-winter, because quite high temperatures can build up in a frame although the air temperature outside may be below freezing. This requires careful watching. It is better to shade the frame and, if possible, to give a little air on warm days to prevent the build-up of high air temperatures.

Regular watering or syringing is necessary to maintain the cuttings in a healthy and turgid condition. This can be applied manually and will usually be necessary once or twice, or up to five times a day, depending upon the time of year. For instance, soft summer cuttings, taken in June or July, will

need syringing four or five times a day in order to keep them turgid, whereas harder cuttings of the evergreen type, taken in October, November, December, or even in early spring, will require syringing perhaps not more than two or three times a week, depending upon the weather conditions prevailing.

A Mist System

This syringing can be done "automatically" by a mist system. It is a quite simple matter to put one or two mist jets in a frame such as I have described, which can be operated manually or, if you wish to go to the expense, can become fully automatic by attaching a time-clock which will allow the mist to be applied at predetermined and regular intervals. This regular application of water either manually or automatically, brings us once more to the controlled conditions of high humidity and the conservation of water in the unrooted cuttings while they are being reestablished, which are essentially the conditions to be found under that upturned jam jar I mentioned earlier.

Do not be afraid of putting in a simple mist system. There are a number of jets which provide excellent mist at normal city water pressures—one is the Florida type jet which costs about three dollars and another is a new type of Monarch jet which operates very well at quite low pressures of twenty-five to thirty pounds. A frame such as we have constructed measuring six feet by six feet can, with good pressure, be fairly well covered with one jet placed right in the center. However, if you want to be absolutely sure of covering the frame completely, then put four jets in the frame, and set them on risers which come from the ground to a height of about twelve inches above the rooting medium. Copper tubing can be laid on the bottom of the frame underneath the rooting medium, and the uprisers come straight through this to hold the jets above the cuttings. If your frame is backing on to the house, then water can be piped from the cellar directly into the frame, and without going outdoors, you can, once or twice a day, turn a valve and water your cuttings.

The time-clock, which turns the mist on or off morning and night and provides as much misting as you want in a six-minute cycle, costs $65 complete with solenoid valve. This may seem rather a lot of money for the amateur to spend in setting up a propagating unit. Perhaps it is, and yet I can assure you that the fascination of taking really soft cuttings from magnolias, Japanese maples, and similar trees in the height of summer, inserting them in the frame under mist, maintaining them in a bright, vigorous, and turgid condition while they root with amazing rapidity, is one of the most rewarding operations for the keen gardener.

The speed of rooting will depend upon the time of the year and the type of cutting. For instance, soft summer cuttings, if maintained under a mist, would root very rapidly and should be ready to leave the frame in three to four weeks. Cuttings of evergreens taken in the fall, winter, or early spring, will require perhaps from eight to ten weeks to root, but should by then have rooted strongly so that the plants can be removed from the frame. This procedure requires a little care because if the plants have been maintained and developed under carefully controlled conditions, they have to be slowly reconditioned to the vagaries of the normal atmosphere before they can be removed to outside quarters without undue loss. Once the cuttings are well-rooted, the degree of misting should be reduced, more air should be given day by day, and the cuttings hardened up to prepare them for removal.

In most instances, it is best to pot the cuttings once they are taken from the frame, so that a good root system can be established in the pot before they are set out into their final quarters. This removal of the cuttings from the frame should also be timed, whenever possible, to coincide with the seasons. For instance, cuttings which have been put into the frame late in autumn, and have rooted, should not be removed and placed in an exposed condition during the winter. Such cuttings are best left in the frame and brought out in the spring, so that they can be moved to new quarters at the time of the normal surge of spring growth.

Grafting

I have not mentioned grafting, but I want to end on this note because there is no reason why you should not aspire to this aspect of propagation which is acknowledged to be the sphere of the professional. Grafting is a relatively simple procedure, once the conditions for its successful completion are known. We have again to consider the water-economy of the plant material with which we are working, and this points up once more the value and importance of a simple mist system in the propagating frame. Given such a mist system, it is comparatively easy for the amateur grower to engage in the grafting of a few plants with which he is particularly interested.

The proper understock may be difficult for the amateur to obtain; he may have to engage the sympathetic help of his local nurseryman in order to get a few understocks of the right kind. The plant to be propagated has a close relation which can usually be propagated quite easily from seeds. These plants are so raised by the professional propagator, and the seedlings are then used as the root stock upon which the desired plant is grafted. It is essential that the understock be of a variety which is closely related to the plant to be propagated.

Some people may be quite surprised at the relationship of plants which they had previously thought quite unrelated. For instance, a common root stock for the hybrid French lilac is California privet. The privet is really a nurse root stock which lasts only for two or three years and maintains the lilac in a healthy condition while it slowly reestablishes its own root system. In any event, the propagator must first acquire a few root stocks of the right kind, and the size of the root stock should be, as far as is possible, the same as the material which is to be grafted. Usually, this means pencil thickness—this is the standard which most propagators use for their grafting understocks.

In grafting, it is first necessary to cut the understock, cut the scion, and then to bring the two cut surfaces together and to bind them together so that they eventually join. There are, of course, many methods of doing this. However, a simple cut on the side of the stem of the understock, removing a thin slice, and an equally simple cut on the side of the scion, is all that is really required. Place the two cut surfaces together, adjusting one edge of both stems so that they exactly meet, and then bind the two together with a rubber band or strong twine which has

been thoroughly waxed with parafin wax, beeswax, or any other simple preservative. Place the graft so that the point of union is completely covered with the medium in the frame, preferably the sand and peat medium, and keep it there from four to eight weeks. In this period the two pieces will grow together and you will then be able to remove the plant, slowly reduce the size of the understock until it can be cut away completely, and leave the required variety growing on its borrowed root stock. For these and other procedures, I cannot recommend too highly a new book on plant propagation which has recently been published. It is called PLANT PROPAGATION IN PICTURES, and I strongly urge any keen amateur to study the excellent illustrations and text.

Spring is just around the corner—the surge of life is rising—and now is the time to take the hammer and saw from the wall and commence building that propagating frame which can, and most assuredly will, give you boundless pleasure throughout the years to come. Don't hesitate longer, friend; start building now!

GROWING HOLLY **(from page 12)**

young trees off to a start with severely distorted root systems.

Young coniferous evergreen seedlings an inch or two tall may have roots as much as four feet long. Rooted holly cuttings ordinarily will have a much shorter and more compact system of roots in proportion to their height. Nevertheless, when these cuttings are transferred to and grown in squares, pots, or impervious containers, the largest roots eventually will conform to the shape of the container, grow back into the soil ball, and form sharp bends and curves that cannot be straightened without breaking the root tissues. If set out later with the artificial root ball intact, the twisted interwoven primary roots will grow in diameter and eventually form a gnarled mass of interfering roots that can cause poor top growth and ill health. So-called choking or girdling roots in older trees are examples of similar trouble. The primary roots, sometimes called "mother roots," are those which give early anchorage and normally produce the first fibrous roots at greatest distance from the root crown.

So far as I am aware, roots that originate from cuttings rarely if ever form a true taproot, but seedling hollies usually do have taproots. I have purchased a few hollies in which the scions of the selected variety were grafted on seedling stock. Apparently the stock plants were container grown, because the taproots were twisted into a tight spiral which could not be straightened. None of my plants survived efforts to straighten the distorted taproot. The single specimen that I planted just as I received it, continued to live. This year, four years after planting, I decided to move this holly because it was practically without growth. The root mass was about the original size. I did not tear the root ball apart to see what had happened to the taproot, but there was no evidence of a taproot below the original soil ball. Either it had died or had failed to extend itself; moreover, primary and secondary roots were dwarfed and almost lacking.

In early September of the present year I decided to move about a dozen American and English hollies that were growing rather poorly. Because they had been planted for four to six years, I anticipated some real spade work. Such was not the situation. Only one plant gave me a bit of trouble; the rest had practically no root ball. After lifting, I broke away the soil, carefully, and in every case the dirt fell away, disclosing a mass of tangled roots conforming to the shape and size of the original container in which they had been grown as young plants. These young hollies had been growing in good garden soil, well mulched with peat moss, decayed chestnut wood, cow manure, wood chips, and oak leaves for four to six years after removal from containers.

I am concerned about these poorly developed root systems, not because they are on my plants, but because other holly hobbyists must be having similar experiences, people who do not know what the trouble may be with the young hollies, and who are not aware of what they can do to help the young trees to better growth and longer life.

Growing rooted cuttings and young plants in impervious containers for one to several years is an established nursery practice. Some individual nurseries in the country have many acres of black hardtop macadam devoted to the pot culture of woody ornamentals. Considerable research, therefore, has been made on how to grow good-looking, healthy potted stock for retail trade. I do not know of any study concerned with the best method to handle such stock after it is planted out, on its resources, and without the daily ministrations of the grower expert. A plant with a vigorous top and a restricted root system will have difficulty in surviving without special care for quite some period of time after it is planted out. Evergreen hollies grown for several seasons in impervious containers are subject to the same difficulties as other woody plants. Since they are *broadleaf* evergreens they may have a more difficult time than coniferous evergreens, because of the continuous demand for water by the physiologically active foliage and the large area of transpiring leaf-surface.

Container grown plants are usually out of balance, especially if the tops are growing vigorously. With daily watering and particularly fertile soil, top growth can be unusually good even though the root system is restricted to a small ball of soil, and is unduly twisted and tangled. When such plants are placed in the possession of the average home owner, however, and he, in turn, plants them and leaves them to all the vicissitudes of weather and the home grounds, it is a marvel that so many plants survive. The relatively minute root system has to depend on a small mass of soil for moisture, until more extensive growth develops. The season, soil temperature, available moisture, and root entanglement are factors that will determine when and how much root growth will occur. Until the top and the roots reach a proper balance for the particular site and micro-climate, life for the young plant is hazardous.

Whereas severe root entanglement is a future threat to good health of holly plants, the restricted root system accompanying root entanglement probably is the greater immediate temporary hazard. I have studied potted hollies and other container-grown plants, and I have observed that when the primary roots are tightly interwoven, secondary roots are relatively scarce and sometimes almost lacking. Such plants simply cannot produce their best growth without more attention for a longer time

(Continued on page 21)

Laurel Hill herb garden under snow

The Country Housewife's Garden

By **Gertrude B. Foster**

"HERBS ARE OF TWO SORTS, and therefore it is meet (they requiring divers manners of husbandry) that we have two gardens: A garden for flowers and a Kitchin garden: or a Summer garden: not that we mean so perfect a distinction, that the Garden for flowers should or can be without herbs good for the Kitchin, or the Kitchin garden should want flowers, nor on the contrary: but for the most part they would be severed: first, because your Garden flowers shall suffer some disgrace, if among them you intermingle Onions, Parsnips etc. Secondly, your Garden that is durable, must be of one forme; but that which is for your Kitchins use, must yield daily roots, or other herbs, and suffer deformity. Thirdly, the herbs of both will not be both alike ready, at one time, either for gathering or removing."

Thus wrote William Lawson in The Country House-Wife's Garden in 1637.

Two gardens have never been enough for us since buying our old house on the south side of a Connecticut hill, in the town officially called Canaan but known to the postal service as Falls Village. Only in the spring break up of icy ponds and streams or at flood time is there much water going over high wide falls in the Housatonic and to see it we have to drive across the bridge to the neighboring town of Salisbury, but we are pleased to have the only address of Falls Village in the U. S. Government Postal Directory.

Our village may be tiny, our falls high but lacking water due to the Power Company's sluice, but our place is large enough and varied enough to permit many little plantings on all sides of the house. The one that means the most to me in the spring is the kitchen window garden. It is on a little slope under a flowering crab tree on the northeast side of the house, just outside the casement window over the sink. Tall maples and several ash trees just above it make it too dry to grow flowers in summer, but for spring bulbs it is the best location we have.

When the crab tree has had a good crop of fruit as it did last summer, whole flocks of cedar waxings or evening grosbeaks may descend upon it any winter day. Then the tree seems to bloom again with outsize blossoms of fluttering winged, brightly marked birds who eat the shriveled, raisin-like apples. The flowering crab was one of the few pretty shrubs left on the place when we took it. The two hundred year old house had once been the home of people of some means, who must have had a love of beauty, for natives of the town remember when flowers and bushes graced the yard. A few decades of neglect and misuse of the land by people of southern Europe, who cared more for the fruit of the vine and the vegetable in the can, had left every sign of cultivated plant buried or choked by heaps of rubbish.

The way in which sweet woodruff grows under the flowering crab makes me think it has some special affinity for the soil above apple tree roots. The only other patch I have seen spread so rapidly and flourish so well is on a friend's place where it also grows in the shade of an apple tree. *Asperula odorata* with its delicate whorls of leaves, slightly hay-scented when dried, likes this region. It is a close relative of the native bluets, *Houstonia caerulea,* which abound in pastures and thrive in our rock gardens.

Our sheltered situation brings us bird visitors much sooner than other parts of the village. Sometimes robins are found scuffling in the leaves near the spring behind the house in January. When our largest snows fall in January and February, the sun is strong enough to melt the top layer during the day. At night it freezes hard, locking the earth in a glittering, cold white plaster cast. But from my office window I can see the ruddy breasted birds fluffing themselves up in the shelter of the trees and I marvel at their courage, or foolishness. The water bubbling out of the spring keeps a small patch of ground clear of ice and here the robins have a morning conclave. Then they fly up to the staghorn sumac grove beyond the rock garden to peck the withered, red berries which have stood upon the topmost branches like inverted cones all winter.

A country garden is not a dead thing even in winter. Where there are herbs, gray and green shapes suggest the design of the garden which is so pretty even under snow. The tall skeletons of angelica plants, which were not cut down after the seed was collected, look like fairy diadems when shining with rime in the slanting sunlight of early morning. The Housatonic River a quarter of a mile below us produces a warm fog under certain frost conditions which gives us mornings in February which seem enchanted. Every weed, twig, and vine is spangled with diamond dust before the sun has reached a height sufficient to melt the frozen fog crystals.

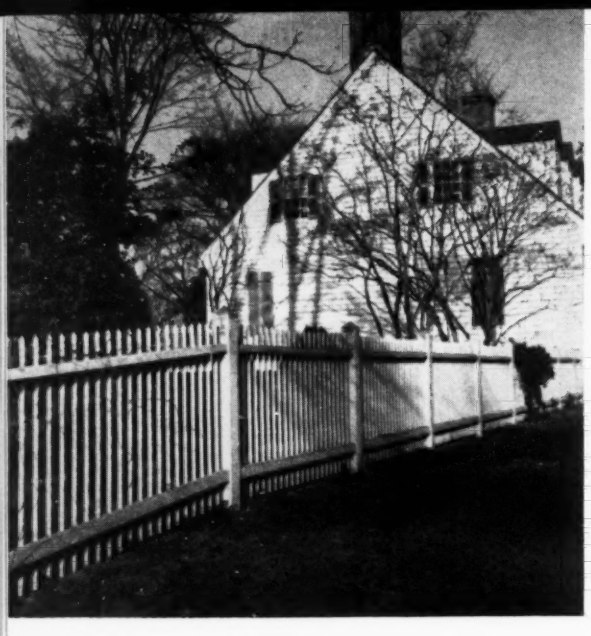
In a limestone area, like ours, it is necessary to have a water softener to save soap, skins, and clothes from the hardness of the water. We collect rain water for the plants in the house in order to save the softened water for household use. Whenever it rains the big watering can is placed under the downspout. Melting snow fills it quickly on bright days when icicles drip from the roof making our old red house, trimmed with white, look like a frosted gingerbread house. It takes half of a forty-quart milk can, in which we store the rain water, to soak the rosemaries, baies, scented geraniums, and pineapple sage in the bay window.

The water is held at room temperature until used by storing it in the milk can. As long ago as 1688, Leonard Meager had a word to say about the dangers of chilling plants and seedlings with cold tap water:

"Now for the kind of Water that is best to water your garden, it is certain that Pond or Ditch-water is better than Running or River-water, yet that is far better than Pump or Well-water, yet it hath always been my Lot to have no other for my use . . . yet I doubt not but there is a week odds in a Months growth at some times of the Year between watering with warm sat standing Water, and watering with cold Pump or Spring-Water."

FENCES

By T. H. Everett



1. White picket fences are traditionally American. This one, at Colonial Williamsburg, shows pleasing contrast between its slender pickets and stout supporting posts.

FENCES CAN BE OBJECTIONABLE or pleasing depending upon their placement and suitability for the positions in which they are located. The "spite fence" is the extreme of objectionable fences; the beautiful, well-designed, appropriately placed fences so characteristic of Colonial Williamsburg, Virginia, represent the other extreme. Between these extremes are numerous gradations. No fence is right *per se*. The suitability of a fence to its location is at least as important as its effectiveness as a barrier. The kind of fence that is appropriate for a spacious country estate may be quite unsuitable as a surrounding for a modest suburban lot.

When properly used fences give finish and definition to the home grounds. They may be employed effectively to extend the architectural lines of the house. They may be used to provide backgrounds for flower borders and other landscape features. Certain kinds of fences are seen to advantage when plants are set close to their bases or

2. A rear view of the fence pictured at the right. Note that the horizontal stringers are securely bolted to the vertical posts.

3. A simple picket fence with fairly broad pickets which are cut to slightly rounded points at their tops.

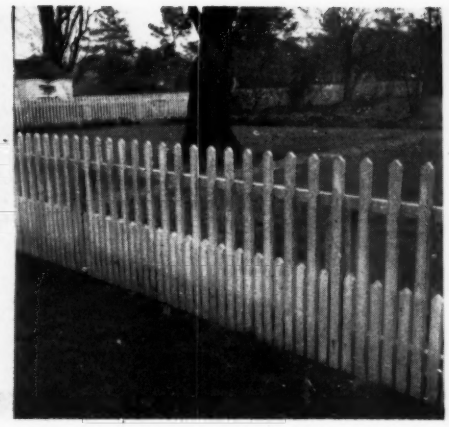
4. The upper ends of the pickets that form this fence are cut in a distinctly elaborate and ornamental manner.

5. Boards with narrow spaces between form this fence. The top of each board is notched to form a double point.

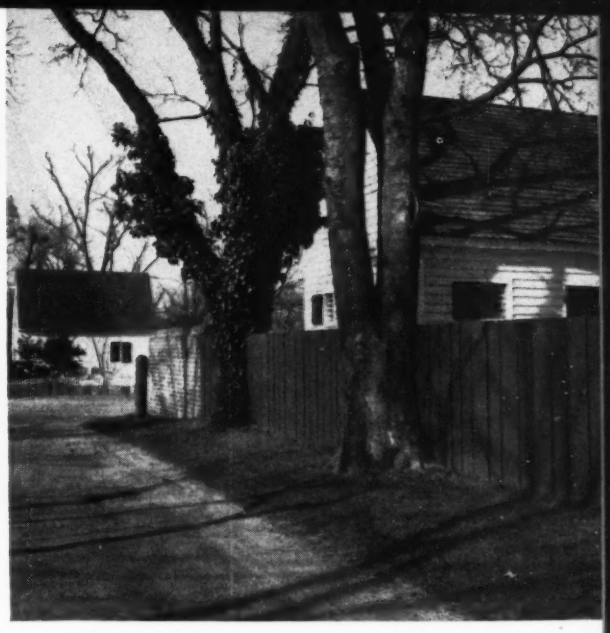
6. A rear view of the fence shown at the immediate left. The tops of the posts are slanted to shed moisture.

7. Charm is given to this fence by using boards of varied widths and cutting their tops in a broad saw-tooth pattern.

ignity characterizes this fence. The posts re beautifully designed and the tops of he pickets sweep between them in grace- l curves.

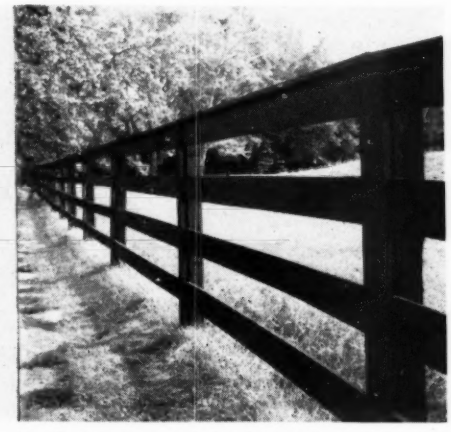


9. A good effect is achieved here by the device of alternating pickets of different lengths. This design is best adapted for fairly low fences.



10. A plain board fence such as this ensures privacy. Additional interest is obtained by using boards of different widths.

ost and board fences, such as this, are ffective where plenty of space is avail- ble but are unsuitable for small prop- rties.

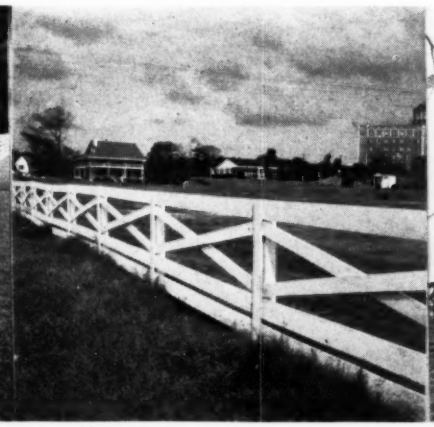


12. A face view of the fence pictured at the left. A broad cap board is used to form the top of this fence.

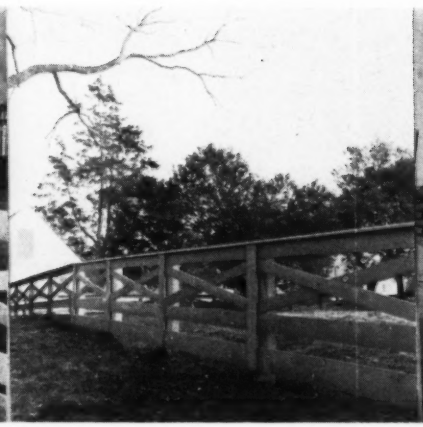
when vines are trained over or against them. Climbing roses billowing over a picket fence or post and rail fence are lovely, a border of perennials backed with a fence of woven palings gains in appearance and profits from the shelter the fence affords. Even the strictly utilitarian galvanized wire fence can be greatly improved in appearance by planting a few shrubs or other plants against it.

The pictures accompanying these notes illustrate a variety of fences; many other types and variations exist. Many can be purchased in easy-to-erect sections, others can be fabricated by the home handyman.

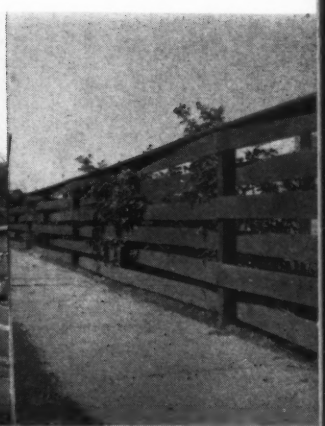
A post and rail fence of more ornamental design. The stout post at the left is a gate post.



14. Interest is attained here by crossing between the posts the boards that form the center part of the fence.

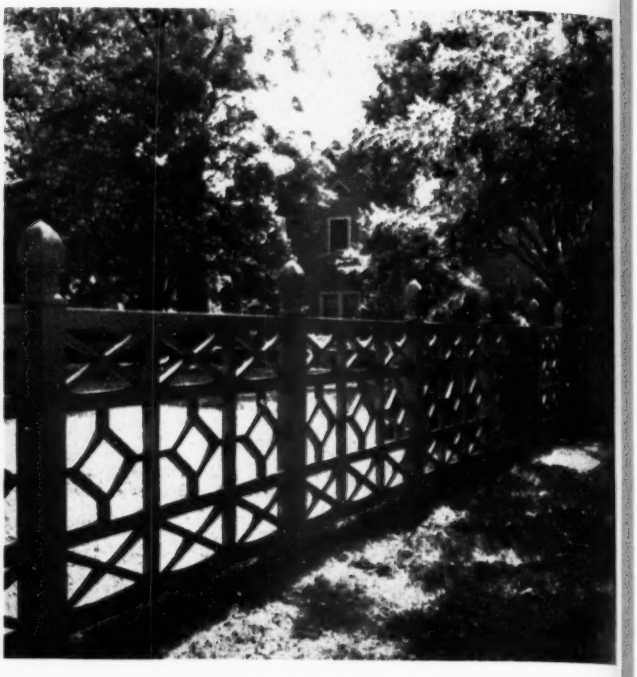


15. This fence is of the same design as the one to the immediate left but it is capped with a broad board.

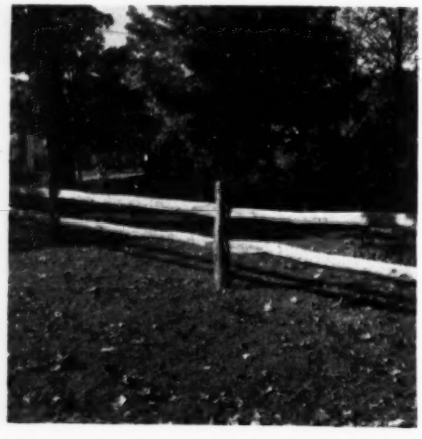


16. Here, boards are used be tween posts to produce basket-weave effect. A ca board finishes the job neatly

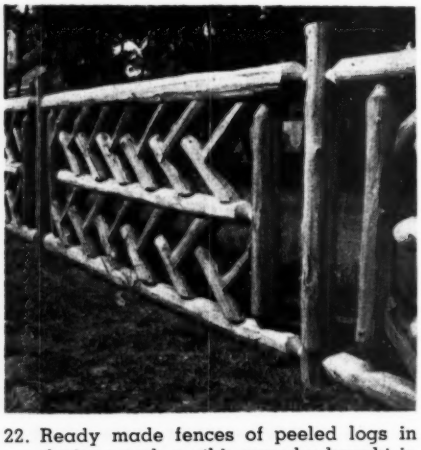
17. Rustic post and rail fences are comparatively inexpensive and look well in rural surroundings.



21. A handsomely designed fence at Colonial Williamsburg. Skillful craftsmanship is necessary to make and install so elaborate a feature.



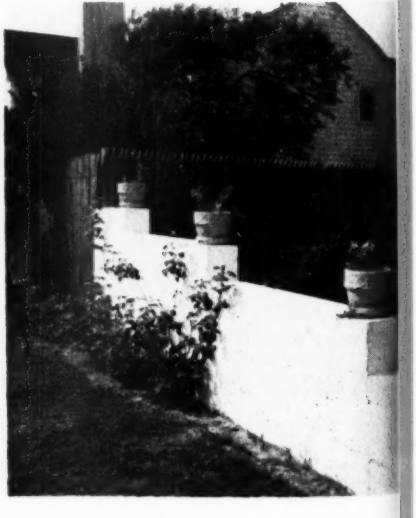
18. A two-rail post and rail fence. The rails fit into slots cut in the posts.

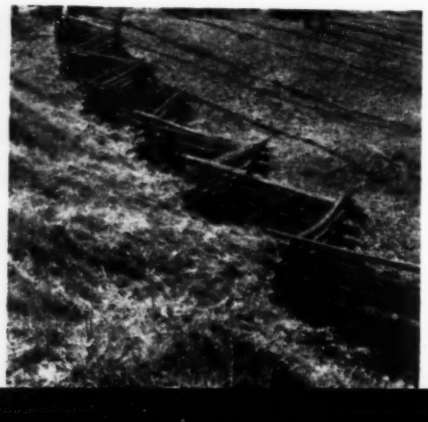


22. Ready made fences of peeled logs in designs such as this may be bought in sections and are easily erected.

19. The English hurdle fence forms a stout barrier and may be used for containing live stock.

23. A fence of close-set palings behind this stepped wall provides privacy and shelter. The palings are woven together with wire and the fence may be bought in suitable lengths.





20. In early colonial times zigzag rail fences (worm fences) were used. These require neither posts nor nails but are extravagant of space and lumber. The ends of the rails are simply laid across each other.

24. Snow fence made of rather widely spaced slats woven together with wire is inexpensive. It is easily erected and taken down and may be rolled conveniently for storage.

25. Galvanized chain link fence provides an effective barrier and is durable. It lacks aesthetic appeal but can be improved greatly by suitable planting along its base.

26. Wrought iron fences are long lasting and may be made in many handsome designs, from simple ones, such as this, to much more elaborate ones.

THE LADY PETRE PEAR TREE (from page 6)

quince stocks and succeed better than pear stocks with us."

Robert Carr, who married Ann Bartram, daughter of John Bartram Jr., and had inherited the garden and was managing it, wrote on November 18, 1831 (published in Gardeners Magazine, London, Vol. VIII, 1832, page 387), as follows:

"A fine seedling Butter Pear cultivated in the Bartram Botanic Garden by Col. Robert Carr, Proprietor.

"Petri Pear a middle-sized pear; tree branches smooth brown leaves on long slender petioles, narrow leaves oblong lanceolats, base acute end acuminate, hardly crenate, entire at the base about two inches long; very smooth, midrib yellow.

"Fruit clustered two or three peduncle curved brown half an inch. Pear oboral truncate at both ends 3 or 4 inches long swelled at top. Skin thin greenish yellow with small pale spots. Inside white soft jucy melting like a butter pear deliciously flavored, peculiar very slightly musky and vinous. The tree which produces the above exquisite fruit was raised from seed received in a letter from Lord Petri of England about the year 1735; and planted by Mr. Bartram near the end of the dwelling house at the edge of the gravel walk where it never received any manure or rich earth. The roots extend to the wall of the house. The tree never has been subject to blight and has not once failed in the last thirty seasons producing 10 or 12 bushels of fine handsome fruit which is good eating from the middle of September to Christmas. The fruit is always worth from three to five dollars a bushel. The stem of the tree is about 14 inches in diameter and 25 feet high. It is in the most perfect health although near a century old and probably has borne near 500 bushels of pears. Mr. Bartram informed me that the tree was about twenty years old before it produced and narrowly escaped being cut down as barren."

GROWING HOLLY (from page 16)

than the average home owner gives his plants following his first enthusiasm for the newly purchased specimens.

What does this lead up to? Simply this, there is much still to be learned about the artificial reproduction of plants and their early culture. Those who grow hollies in impervious containers can improve the growing conditions somewhat, and should feel the responsibility of supplying the best possible information for handling the newly-planted stock. Studies of container-grown plants after they are set out, might well be sponsored by growers in order to obtain the most reliable information for the buyer. Hollies should be started in containers chosen on the basis of suitable size for the plants, rather than for space available to the grower. The plants should be kept in containers for the minimum period of time. Perhaps seedling grafting stock should have the taproot removed. I believe that topgrowth ought not to be encouraged too greatly while in the containers. Possibly planting directions should specify spreading or straightening of the visible roots and not stress so much the advantage of the intact soil ball—for maybe it is not an advantage particularly if the plant has been in the container for an undue period. These facts are known by most of us, but we seem to have accepted them as incident to present-day methods of holly culture.

Some of you have made an effort to eliminate certain adverse features associated with container grown plants. A member of the Holly Society of America, and one of the early holly enthusiasts, has been growing his hollies for years in wire baskets with a comparatively large soil ball. Quite recently another member has begun to produce similar baskets commercially. In my opinion this is a progressive practice. Perhaps others in the Society may undertake to sponsor or conduct studies that will improve the present methods of culturing native and exotic hollies while in and removed from impervious containers.

Outdoor Chrysanthemum Culture

By Spencer Harrison Capreal

continued from November-December

Above Soil Surface

It may be said that when a plant comes to life, enzymes appear; amino acids and auxins (growth substances) are produced; cell enlargement and division take place. This process continues until leaves appear, when photosynthesis begins; stems elongate and more leaves appear, providing the plant with more leaf surface. Eventually, growth will cause more stems and flowers to appear.

With chrysanthemums, it is important that one starts with healthy, disease-free stock plants which will send out vigorous shoots and form turgid leaf structure. It is this healthy stem and leaf structure which provide the proper propagating material. Propagation by cuttings is simple, and controlling the height or type of bloom (sprays and disbuds) can, to a great extent, be governed by the treatment followed.

Our discussion will be confined mostly to cultural practices and conditions that are giving satisfactory results in the metropolitan New York City area (latitude 40°30′ to 41°15′ north)—and some of the reasons behind them. Whenever practical, examples of other latitudes or places will be mentioned.

It has been estimated that there are some five thousand or more varieties of chrysanthemums in commerce. I dare say that more nearly ten thousand varieties have made their way into catalogs in the past twenty-five years.

In considering chrysanthemums we shall exclude the annual forms (grown from seeds), the azalea-mums and the frutescens types, and any hybrids from these sources which bloom throughout the long-day summer months.

Fall-blooming chrysanthemums are classified as short-day plants. The term "short day" means that flower bud initiation takes place as the nights grow longer. Crown buds, being more sensitive to the shortening incidence of daylight than are terminal and secondary buds, generally appear first, followed later by the other buds. The period when the flower buds appear will differ with the variety grown. Flower buds will be seen on the early varieties first and, progressively, on the later blooming varieties.

Since our objective in this Part Two is to discuss bringing chrysanthemums into bloom before the end of October (weather permitting), we shall assume that the natural blooming dates of the varieties used shall be before the end of October. We shall follow this with a chapter on frost protection and a chapter on short-day treatment which is a method of hastening the blooming dates of October and November-maturing chrysanthemums. There will also be a chapter on interrupted short-day treatment, a method of producing variations in spray formations.

First let us see when and how flower bud initiation takes place and how the buds develop into full bloom.

October-blooming varieties take from six weeks to nine weeks, under favorable temperature conditions, to intiate buds and come into bloom.

Chrysanthemums require nine and one-half to ten hours of darkness (not heavy shade) to initiate crown buds; ten to ten and one-half hours of darkness to initiate terminal and secondary buds.

By September 21, in our latitude, there are approximately eleven hours or more of darkness. These longer nights are needed for proper bud development. There will be occasional deviations from this schedule. If there are any extended periods of warm weather of 80° F. or higher, or if the temperature drops to 50° or less, bud development may be delayed, retarded, or the plant may go blind. More about this under "Temperature and Chrysanthemums."

Changes in day length vary with the latitude in which the plants grow. The rate of speed at which day length is reduced after bud initiation takes place is important to bud development in chrysanthemums. The more slowly the day length is reduced, the more slowly bud development takes place—and this retards the natural blooming date. Temperature can produce delayed blooming, also. In our New York City area, starting June 21, the length of the day starts growing shorter by two minutes each day. Crown bud initiation takes place between August 15 and August 25. This shortening period of day length affects bud initiation in such a way as to bring the flowers in on their natural blooming dates—this is with the provision that no extended periods of hot or cold temperatures occur at this time to delay bud development. After flower buds start to open, temperature has less effect.

Readers who may live farther south than our New York City area may wonder how day length affects their blooming dates. As previously stated, bud initiation takes place when there is approximately nine and one-half hours of darkness, but longer periods of darkness are needed for buds to develop properly. The more slowly darkness comes to a given area, the later the buds will develop into blooms. Add high temperatures to the day length and greater delay is probable.

For experimental purposes, the late Dr. Kenneth Post created at Cornell identical temperatures and day lengths as found in Miami, Florida (latitude 26° N). Using the same varieties in two different plots, one having Miami conditions and the other the normal day length at Cornell (45° N), Dr. Post produced flowers on the Miami plot one month later than they bloomed on the Cornell plot.

Another example: Richmond, Virginia, and San Francisco, California, are not far apart in the same latitude, a little below 38° N. At Richmond, darkness comes on more slowly than at New York City. Therefore, bud development is a little slower and blooming dates are delayed as much as a week or so. San Francisco (coast area) has some unusual conditions which bring

in blooms a week earlier than our area. It has favorable temperatures and any one who has seen those fogs rolling in on many afternoons can readily see how day lengths can be shorter. The short-day treatment helps the grower to produce blooms closer to the date he wishes.

Chrysanthemums are classified under a number of types of bloom formations that need not be mentioned here. Catalogs give ample descriptions and blooming dates. However, the varieties should be divided into two groups in order to make a distinction between the main part of our cultural discussion and the group that has and is making many home owners happy.

Group 1: Most of the chrysanthemum varieties that come into bloom by or before October 10 are generally classified as garden varieties. Cultural care is comparatively simple in this group. Probably the most desirable results will occur from growing them in a bush form which will produce many flowers.

Garden varieties readily adapt themselves to landscape plantings for mass effects. Most everyone has seen azalea plantings in bloom—with proper planning and care, one can achieve the same breath-taking merge of color with garden 'mums.

A number of nurseries throughout our country have displays of chrysanthemums that are worth observing. Two such displays are not very far away: Thomas' Flower Mart on Jericho Turnpike, just west of Oyster Bay Road, Syosset, Long Island, and Bristol Nurseries, Bristol, Connecticut, from October 8 to 14. Most of these nursery displays are kept low by planting late (early July) and close together—about eight to twelve inches apart.

For the home owner who wishes to produce a mass color effect, there are several schedules to follow, based on uniformly rooted cuttings about eight inches high.

1. If you plant the first part of July, which is considered late, pinch once, space plants eight inches apart.

2. If you plant just before the middle of June, pinch, and then pinch the new lateral branches before the middle of July; space plants ten to twelve inches

3. If you plant May 20, pinch, pinch again June 18, and again before the middle of July; space plants twelve to fifteen inches apart.

4. If you put plants out May 1, or earlier, they will develop stronger growth and enable you to make one or two additional pinchings. Spacing eighteen inches apart is not too much.

Pinching, an important factor in producing low or bushy plants in garden varieties, means the act of taking the soft tip of any stem or lateral between thumb and forefinger and gently breaking it off. This can be done in such a way as not to distribute the juices of one plant to another. After every pinch, lateral branches will grow out of leaf axils. When these branches are about six inches long, pinch again. Keep pinching until the middle of July and then stop. The number of pinches that can be made will depend on how early the plants are set out.

It would not be unusual to have plants three or four feet broad if planted early and given a little extra care, and they will repay with an almost solid mass of blooms. The small and medium-size pompons are good for this purpose. The decoratives also make a handsome picture.

Disbudding is of no particular value. If you plant early and pinch only once, plants will grow tall and will need staking against wind and rain.

With the exception of planting out dates and pinching, follow cultural practices in Group 2 (cuttings, watering, fertilizing and spraying).

Group 2: In this group are all of the commercial and exhibition varieties that come into bloom naturally in October. Their characteristics and responsiveness are quite well understood. With a knowledge of these, excellent results should be obtained. We say "should be obtained," because temperature and day length play an important part in the end results (blooming date, type of spray and disbuds).

Before we start our study of cultural practices, I should like to define terms that will be used a great deal in this discussion.

DAYLENGTH: Earlier, we discussed shorter days and their relationship to bud initiation and development. Day length can be deceiving, too. A few days (three) of dark stormy weather, or a few stormy evenings followed by stormy mornings can readily initiate crown buds and start the plant on its way to bud formation. If such days occur in July or the first half of August, buds will almost certainly appear by or before the third week of August. The most dangerous period for unwanted buds is before the first of May. Nights are naturally long enough to initiate buds if the temperature is over 50° F. It may take several months or even more for these buds to show. Then again buds may appear quite early. It all depends on how early buds were formed and on temperature conditions. In any event these early buds should be pinched out. The better commercial propagators break up the long nights with electric lights to prevent bud initiation. Long days (over fourteen and a half hours) prevent bud initiation.

TEMPERATURE AND CHRYSANTHEMUMS: It has been known for quite some time that 60° F. is an optimum temperature for flower bud initiation and development and vegetative growth, with a favorable day length. More recently, 1952-55, experiments conducted at Cornell University revealed some interesting facts on the effects of temperature variations in flower bud initiation and development and answered a number of questions that had puzzled chrysanthemum growers in the past.

Dr. Henry Marc Cathey, as a graduate student, conducted these experiments as his thesis for a doctorate. For this work Dr. Cathey received the 1955 annual award of the Society of American Florists and a Fullbright scholarship grant (the first in floriculture) to study in Holland. The experiments indicated some temperamental characteristics in chrysanthemum responses to temperatures of 50° F., 60° F., and 80° F. Dr. Cathey suggested that chrysanthemums could be divided into three temperature classifications such as:

1) Thermozero: Varieties that form buds and develop into blooms from 50° to 80° F. More blooms occur on plants grown above 60° than below 60° F.

2) Thermopositive: Varieties that do well and bloom from 60° to 80° F. No flowers with 50° F.

3) Thermonegative: Varieties that produce flowers from 50° to 60° F. Blooming delayed with 50° F. No flowers with 80° F.

Minimum flowering time in all varieties was obtained with a continuous 60° F.

A summary of these temperature experiments are to be found in The Garden Journal of The New York Bo-

tanical Garden, September - October 1955 issue, pages 143-145.

In any cultural program, watering, fertilizing, and spraying are a "must" for good results. Therefore:

1) Keep soil moist, not wet. One quart of water for each plant, twice a week is not too much. With hot and dry weather, additional water may be needed. If plants are spaced more than ten inches apart, increase the amount of water in proportion.

2) Liquid fertilizer is recommended once a week. Plants do require a continuous supply of nutrients and once a week will prevent a feast or famine condition. Follow recommendations under fertilizers, Part I.

3) Disease and insects are always a problem in outdoor plantings. Regardless of how healthy plants may be, there are insects that mutilate the foliage and spread disease. Spraying once a week is good protection. Additional spraying may be needed for aphids. There are a number of kinds of aphids, and the females have a strange way of producing young throughout the summer months without benefit of (male) fertilization. By September and during cooler periods, males appear; mating takes place and eggs are laid for the following spring population. Aphids multiply fast and controlling them is important — especially the later ones. Follow recommendations in Part III for spraying chemicals.

Planning in advance a schedule for your summer program means the difference between success or disappointment.

1. If you have a flower bed for chrysanthemums only, consider its physical structure. Does it need organic matter? Peat moss is recommended. The coarser types generally used in stables are cheaper and longer lasting. Mix limestone with the peat and dig it into the soil when temperature is favorable.

2. If disease has been quite noticeable during the previous year or years, consider soil sterilization. The application of methyl bromide containing two percent chloropicrin, at the rate of one pound can for each one hundred square feet, or two pound cans if disease has been severe is recommended. It will be much safer to use this with other plants close by. Refer to sterilization in Part I.

3. What kind of flowers do you wish to grow? Large disbuds or sprays? There are many varieties that are suitable for disbudding and other varieties that are better for sprays. The size of bloom will depend a great deal on whether the variety grown is suitable for a disbud or a spray—the catalogs generally include information on these points.

4. The height of a plant when fully grown depends on the time it is planted out. A plant set out the latter part of April can reach a height of six or seven feet at blooming time; progressively, later planting reduces this height. Early planting will not produce blooms earlier nor will they be any better. With the exception of garden varieties (group 1), planting in the latter part of June or July 1 is good practice, especially if you "time" pinch.

There is a novelty type—tree chrysanthemum—which you may have seen at flower shows which you may wish to try. Plant as early as you can, and grow the plant to one stem and to a height of four to five feet and pinch the tip before the middle of July. Soon, vegetative growth will appear between leaf axils; save as many of these laterals as is desired. Strip all those below. Staking and tying from the beginning will keep the plant straight. The laterals (side branches) can be grown into sprays or disbuds. The spread of the branches can be controlled by tying or wiring to any shape desired. A top spread of three to five feet is not uncommon. Planting before May 1 will require night lighting to prevent bud initiation.

5. After you have chosen your varieties, the next step is to decide when your plants should be planted out to make sure you get the length of stem desired. Normally, from four to six weeks of vegetative growth, after pinching (time pinching) to bud initiation period (August 15 to 25) will produce around a thirty-inch stem by blooming time. Here, again, varieties chosen (read your catalogs carefully as to height) and temperature can affect growth.

Cuttings taken from soft stem tops and rooted in a sterile medium such as vermiculite, expanded oyster shells (known as "Krum") or sterilized sand, make the best roots. Planting them into their permanent position very shortly after they are ready will produce the best plants and the nicest flowers. Keeping cuttings in the rooting medium too long will harden stems and retard proper development.

Make cuttings last of plants you wish to grow to a single stem, make and plant a week later than you had planned ordinarily. They will come into bloom a week or so earlier.

6. Time pinching is a method of producing a terminal cluster of buds which may be grown as a terminal spray, or as a disbud. Experiments conducted two decades or so ago by Dr. Cecil Dilworth developed a terminal cluster of buds by pinching one hundred days before the natural blooming date peculiar to each variety. This works pretty well for southern Canada and northern United States but not too well for our area here. Warmer temperatures and longer days are probably the reason. However, it is still good practice to time pinch. You will probably produce more terminal clusters with time pinching. Most catalogs give dates for pinching.

Your planting date can also be governed by the time pinching date. Allow one week, and not more than two weeks between planting and pinching. You want the laterals that grow from this pinch and not the stem below it.

7. DISBUDS AND SPRAYS: There are two types of disbuds: (A) One grown from a crown bud with bract-like leaves, for a little distance below the flower head. (B) A bud selected from a terminal cluster (generally the center one) with leaves growing out, very close to the flower head.

There are two spray types when grown naturally (without short-day treatment): (A.) A terminal spray (no crown bud) is a cluster of flowers rounding at top and tapering down the sides with only one flower on each stem (pedicel). Some varieties have a tendency for the flower buds to grow in a cluster very close together on very short pedicels. Other varieties will have very open tops, the buds growing on longer pedicels. Pedicel length can be regulated with interrupted short day treatment, which see in a later issue. (B) A compound spray is any spray with one or more crown buds and any secondary branch with more than one flower, where there has been no disbudding.

Before the spring work actually starts, planting schedules should be

(Continued on page 29

FLORIDA'S FAME

By **Hedwig Michel**

Mango 'Kent' is a Florida variety

FLORIDA'S FAME rests in her climate. A region that twelve months of the year produces tree-ripe fruits, so many that even market owners in the South have to get familiar with them, a region that all winter long produces and ships freshly harvested vegetables, a region that grows the year-round an abundance of flowering and highly ornamental plants—such a region is, indeed, endowed with natural riches. And year-round plant activity means year-round work for farmers and also home gardeners.

Due to its exceptional climatic conditions, Florida has become the winter garden of the nation; and in recent years, vacation land in summer as well as in winter. Though not in the torrid zone, southern Florida is the site of many plant introductions from tropical countries, and a botanical hike through southern Florida is like taking a trip around the tropics of the world guided by the imaginary circle, the equator.

That portion of the globe, the "Tropics," consists of two equal parts, the Tropic of Cancer, north of the equator, and the Tropic of Capricorn, south of the great circle; a land practically without seasons, where either the wet or the dry period reigns, but undisturbed by low temperatures in most of the region.

The Tropic of Cancer passes through the center of Mexico, just misses the northern point of Cuba, cuts through the Sahara Desert, crosses the Nile at Dendur, north of the Nubian Desert, divides Arabia centrally, then passes through northern India, China at Canton, and the island of Formosa in the Pacific Ocean, passing a little north of Hawaii. The Tropic of Capricorn crosses Chile, Argentina, Paraguay, and southern Brazil, strikes Africa just south of Walfish Bay, cuts through the northern Transvaal and Portuguese East Africa to Inhambane Bay. It then passes through Madagascar and divides Australia.

From many of these tropical countries southern Florida's remarkable botanical physiognomy originates — her typically exotic vegetation. Amazing that plants native to the torrid zone adjust themselves to a region of the latitude of Florida. Skill on the part of horticulturists is one explanation, though not exclusively. Man alone, neither horticulturist nor scientist nor plant introduction researcher, can wholly claim credit for such outstanding results in Florida's landscape. Man's earnest attempts would have failed, were it not for the rare combination of natural influences which create a specific climate around the southern part of the Florida peninsula.

The "Great Ocean River" and the "Inland Ocean" and the trade winds are Nature's assistants. Along the east coast of Florida the Gulf Stream, the "Great Ocean River," does its part to step up temperatures in winter and keep them well under control in summer; along the west coast the Gulf of Mexico, the "Inland Ocean," influences temperatures equally beneficial. Between these guardians, the trade winds fan the peninsula on their way to and from the equator: from northeast to southwest on the north side of the equator, and from southeast to northwest on the south side of the equator. From this cooperation of wind and water, creating the rainy season, arise southern Florida's subtropical climatic conditions, in a general way. Soil properties also enter favorably into this teamwork so as to include this part of the United States, the southern Florida peninsula, in the tropics of the world.

Without man's interference nature works twenty-four hours a day in such regions—jungles and wilderness were found when the first settlers arrived. In less than one hundred years the change to prosperity was achieved. The hardships of colonizing, several setbacks, discouraging failures, all the growing pains endured by these settlers, have vanished into the files and archives of Florida's early history. The last fifty years, which have ushered in technical inventions and progress in every domain of human activity, have also seen the exploitation of virgin soil and the colonization of the last frontier. Florida's reputation for producing tropical plant life and her agricultural records are established today.

As far as fruits are concerned, everybody appreciates sun-ripened Florida

oranges, grapefruits, lemons, limes, kumquats, calamondins, and the rest of the citrus fruits. But when it comes to Florida's summer fruits, not only northern people are at a loss. Not too many Floridians are yet fully aware of all the kinds of tropical fruits grown here: Surinam cherry, red mombin, Barbados cherry, governor's plum, guava, *Mammea americana,* tamarind, white sapota, *Malpighia speciosa,* soursop, Jackfruit, lime berry, sapodilla, akee, yellow sapota, seagrape, cashew-apple *(Anacardium occidentale),* carissa, prickly pear, and Kai apple, the avocado, litchi and mango. The last three are already widely known. The mango outrivals all, not only in Florida, but in the world's tropics and is known as the "Queen of Fruit."

The mango is a summer fruit that originates in southeastern Asia, from India to the Philippines, where it thrives from sea level up to five thousand feet in the foothills of the Himalayas. Tolerant of soil and climate, it has made its home in almost every tropical and subtropical country around the globe, with varieties adapted to each particular region.

In India alone over one thousand accredited varieties are on record, and millions of seedling trees enjoy local reputation — an achievement of more than four thousand years of cultivation. All the one thousand varieties of India, as well as all others in tropical countries, are chance seedlings derived from seeds of choice fruits that, after coming into bearing, proved worthy of propagation. Therefore, modern "mangologists" reason that throwing away any of the superior seeds is like discarding a possible winning ticket in a lottery.

Today the mango is India's choicest fruit as it was in the days of the ancient empire. Indians, and with them the rest of the world, are indebted to the Mogul emperors for the superior varieties now in cultivation. The Moguls were so fond of the mango that they had from a thousand to a hundred thousand seedling trees planted. The best seedling varieties then were selected, propagated by inarched grafting, and named after the ruling Mogul Emperor. Thus, came about such exotic names as 'Immamuddeen,' 'Jehangir,' 'Akbar,' 'Shah Jedan,' to memorialize India's potentates in their luscious mangos. References to the mango are found in Hindu mythology and Sanskrit. Buddha himself owned mango trees and often reposed in their shade.

Even in modern times planting a mango tree is a religious duty in India as the foliage is used in their ceremonies. The fruit, however, is an economic necessity as much as a culinary delight. Green or ripe mangos are the food during the summer months. The natives consider it a perfect meal, to eat and to drink at the same time. Some simply cease work in order fully to take advantage of the season. They will eat any kind, tart or sweet, often long before it has time to ripen. There are sweet, juicy, and smooth-fleshed mangos that can be sucked like an orange or scooped out with a spoon. What is not consumed during summer will go into preserves, in all stages of ripeness. When the old-fashioned recipes are exhausted, the modern style of quick-frozen mangos is employed, even in the Far East.

Ripe mangos hang on tree of the Florida variety 'Fascell'

In Florida mango growing has a less colorful background, a less far-reaching history. In the one hundred years of cultivation, over thirty-nine superior varieties have been raised and named. Though not every one of these varieties will reach top priority, chances are that some will prove to be reliable commercial varieties. The 'Haden,' the 'Brooks' and the 'Springfels,' Florida's oldest and most successful commercial varieties, ruled the market for several decades. Unfortunately, some of the unfavorable traits of their ancestors are developing, the 'Mulgoba' in the 'Haden' as an unreliable bearer; the 'Sandershah' and 'Haden' in the 'Springfels,' with a tendency to split and also shyness in bearing. Colorful appearance combined with good shipping qualities are not enough guarantee for future success if the trees do not produce sufficient crops.

Under favorable conditions a good crop should be raised every year, according to Florida's authorities on tropical fruits, George D. Ruehle and R. Bruce Ledin, researchers at the Subtropical Experiment Station in Homestead, Florida. They also point out that a high percentage of flowers should be perfect, and there should be little tendency to produce embryoless fruit; that the fruit should be attractively colored; that it should hold well when shipped and ripen with good quality as much as ten to fifteen days after harvest; that the variety should be sufficiently resistant to anthracnose so that commercial control is practicable; that the flavor should be satisfactory, with flesh free from objectionable fibers, and the stone ten percent or less of the weight of the whole fruit.

Varieties that seem to meet most of these requirements as commercially grown mangos in Florida at the present time are 'Zill,' 'Irwin,' 'Kent,' 'Palmer' and 'Keitt.'

"What a task to raise a fruit with all the virtues of the mango, if there are so many natural vices to contend with," a Florida grower remarked. To obtain greater knowledge of all phases of growing and utilizing mangos, the Florida Mango Forum came into being in 1938. It stimulated interest in the selection of mango seedlings with commercial potentialities and supported all activities concerned with the promotion, development, production, marketing, selling and preserving of mangos. The Florida Mango Forum also devoted its interest to other tropical fruits of future promise.

As highlight of Florida's mango season, the Florida Mango stages its annual meeting in the middle of summer, either at an east coast or at a west coast center of production. In addition to its basic purpose as a clearing-house of what has been learned, and in the near future should be achieved, the Mango Forum sessions are yearly events of social interest and culinary joy. To see the number of Florida varieties, their

(Continued on page 29)

THE NEW YORK BOTANICAL GARDEN IN WINTER

By Irving Reshes

WHO WOULD BELIEVE that in this metropolis of eight million there are oases of the rarest kind—isles within isles, gentle sanctuaries, and retreats which the city offers those who seek refuge from the world of macadam and machinery. One of these is The New York Botanical Garden in the Borough of the Bronx—a wonderful combination of natural wildness and parkland.

Anyone familiar with the Garden knows that it possesses many moods. He who walks its paths, meadows, and thickets, or rambles up and down its wooded knolls, feels its riches. In every season and often in succeeding months, the scene is varied and tinged with surprises. Many years of acquaintance and devotion have made me recognize the Garden's abiding charm, beauty, and revelation in all seasons. Winter is no exception.

To the young in heart, winter at latitude forty-one degrees is not as bleak as many declare—no time to despair. To the naturalist there is no cessation of beauty the year round. To the one who questions, "What can the outdoors afford in winter?" I answer with the following lines:

From November to April, from the first morning frost to the last sign of meltwater, from the fading aster to the appearance of skunk-cabbage, violets and adder-lily, this precinct is worth any visitor's attention.

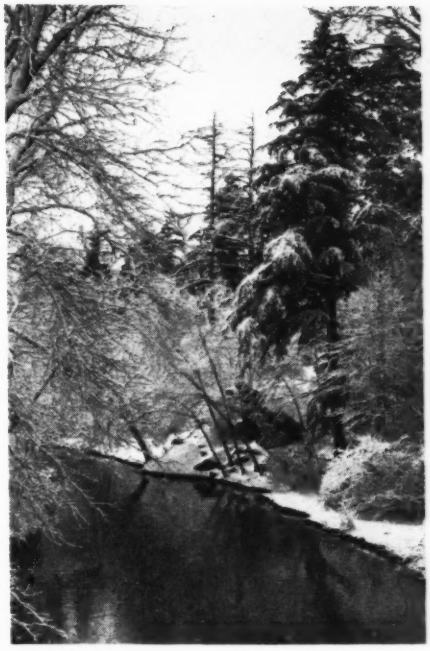
In the verdant months when the earth wears a dress of green and vegetation flaunts its flowers and virility, the backdrop of rock, soil, and terrain humbly recedes from our attention. Not so in winter. The pink gniess, black or grey schist, and sparkling mica like gems now lay uncovered. We pay more attention to the roll of the land. Glacial marks on hard mantle rock focus into sight with their unhealed scars. We note the small and larger rock erratics carried from afar by prehistoric ice shields. Here and there gleaming pegmatic incrusences with coral feldspar or dark red garnets glisten in the sun. The inquisitive geologist roams to his heart's content on or off byways, reading the cryptic message of stone.

We marvel at local curiosities. In the meadow below the Thompson Memorial Rock Garden, the naturalist observes standing in the boggy ground six stele of separated gneissoid boulders. Evidently they were dumped there by the Wisconsin glacier. They are singular stones, weighing many tons apiece and lying in various positions from vertical to horizontal; they suggest toys forgotten by Cyclopean children. Their smooth contours imply the surfaces of a waterfall or cascade. The elliptical grooves carved in their flanks are almost crude statuary. From whence did they come? That is only one mystery in the park amidst many.

Winter is the season of elemental sculpture. Never failing spectacles are the infinitely varied icicles hanging from ledges or oozing out of rocky crevices. Throughout the ridges overhanging the Bronx River we anticipate a display of icy stalactites from December on. They remind us of many things—Mosaic beards monumentally done, or elongated candysticks. Useless to man, yet when spring's zephyrs return, the woodwinds flavor these toothsome winter fruit and find them savory.

Dominating the park's character is the Bronx River. Thoreau proclaimed the Concord; Foster rhapsodized the Swanee; Robert Burns immortalized the Afton. Is there anything amiss when a native son sings of his river? The Bronx is everywhere, a country stream for all its meandering. It is the city's only true river, although several go by the name. As world statistics go, its magnitude is puny. In proportion to its size 'tis admirable. With its prominent falls and cataracts, its gorge carved in obdurate rock, the river is a phenomenon which surprises many visitors to the Botanical Garden. Snow, whether it be a light dusting or a heavy fall, in all its stages from the falling fountainhead in heaven to the last spongy mass snuggling on retired banks, endears the scene to all who witness it.

As good a place as any to admire the river is the arched bridge. Here the hemlocks grow tall and strong, taller seemingly than when viewed from terra firma; the turbulent rapids, laden with icy freight and rushing seaward with a vengeance, inspire meditation.



Snow mantles the trees along the Bronx River in The New York Botanical Garden

My mind wanders. Any one area must humbly bow to the majestic grandeur of total Nature. Yet the soul of man sees as great a wonder in a seed of grass or a crystal of snow, for the spirit of man, like Archimedes' lever, moveth all things. The New York Botanical Garden is a miniature model of the earth and those who appreciate its small secrets shall be lifted ahigh.

It is here, atop the chasm, that the lowering sun catches and enchances the icy sheets or snow-studded rocks dripping with icicles. The walls borrow color from some divine source and glimmer with pastel shades. From pure crystal or softer crystalline snow, from pale emerald to antarctic red-blue, or perhaps golden-brown, they glitter in the sharp resplendent light of the late winter afternoon. The spectator in the park is treated to a canvas of motionless fluidity. Then before plunging over the last western hill, the evening sun sparkles and burnishes every icy facet to its highest irridescence.

Venturing on any park path affords a reward. Many people minimize winter's possibilities, yet this does not discourage the outdoorsman who skates,

fishes, skis, or hikes. Even after the denudation of our hardwoods in November, there is enough greenery in the pines to offset the normal drabness of the winter setting. Although vegetation rests, there is enough presence of coniferae in the park to satisfy average need. In that corner of the grounds dedicated to conifers, winter is as summer. Long after flowering herbs have gone to rest, there is enough grass in the glens to join *Pinus densiflora* var. *umbraculifera* to *Pinus strobus nana.* Often the absence of bold vernal colors is compensated by sparkling ice or the fantastic shapes snow embroiders. Whose imagination has failed to soar with the odd effects encountered? When the frost is deep and abiding, boulders are wedded to boulders and stumps to earth and the whole overlaid with sheets of ice, the shapes simulate frozen travertine.

To the inquisitive student The New York Botanical Garden offers a variety of trees only a lifetime of wandering could fulfill. The Kentucky coffee trees are betrayed by their odd seed pods; no longer resplendent the silk tree from the Orient slumbers in the landscape like any indigenous native. Himalaya white pine, Austrian, Chinese, western yellow, Korean, and Swiss stone pines are but a stone's throw apart—so close are the continents here. To the shackled rover these trees suggest the vastness of the globe and the lure of distant places.

The drabness of winter is a cliché. Winter's pageantry is self-evident to seeing eyes. There is color and artistry everywhere. The naked shoots of bushes become tinged with subtle tints as winter wears on. The drowsing hulks of reddish tulip-trees by the river, ignored in summertime, are now apparent. We are made aware of pallid buttonwood framed against dark soil. Gnarled oaks starkly silhouetted against frozen earth or chaste snow and paper birches set amidst dark woods and green pines are more interesting than ever.

Poems are written for the spring thaw, the returning robin, the young sprouts pushing through yielding mud, the early flowers, the foliation of March and April. Few poets recognize the impressionable onslaught of winter. Much can be said for this late season, too.

On those days when polar air sweeps the sapphire-blue sky, the purity of the scene from Conservatory hill is worth anyone's presence. In the short evening when the gold of the day is fading, he who stands atop this knob feels as though an enchanting goddess raked the embers of the day, enflaming them with the mellow tones of rose and mint.

Not many persons will be found in the park when laboring snowfalls are fashioning a pristine world. But the day after . . . that is a different matter. Yesterday's violent storm is now the beauty of the Garden, pure and ever-absorbing.

Nothing thrills the heart at such times as the joyful presence of feathered friends going about their business. Behold them! From the herring gull, that lover of storms, circling in graceful gyrations, to the chirping sparrow foraging for seed, they cheer and delight. It does not matter whether we flush chickadees from bushy thickets or note a lone starling surveying the scene a hundred feet atop an oak. Rambling through the parkland in sternest winter, we shall be stirred by cheerful groups of birds.

Passing from the general to the specific, let me relate a few experiences out of my book of memory. On one of those sullen February days when life is bearable only in indoor comfort, I doggedly tramped the frozen sod of the Rose Garden. How well I recall where bare branches helplessly fluttered in the north wind — a miracle — a flash of color, a streak of blue. For an instant an invading tropical artist dazzled my sight. It was a bit of magic, unbelievable but true. A bluejay in all its spritely glory had alighted on a numb branch before me. Its sudden presence colored the landscape. Neither the juncoes, tree sparrows, titmouses, nor nuthatches rival the jay's arresting costume. I wonder why tarries this gay creature these desolate days? Should he not be sunning himself in southern climes? Yet, if this be the bluejay's only contribution to man's felicity, t'will suffice.

Another of my treasured memories occurred a little way from the Snuff Mill in a March blizzard. I had not gone a hundred steps from the building into a swirling snowstorm when I detected more than an average movement of birds. Treading carefully into the gloom ahead, I was surprised by a "teek" uttered periodically somewhere to my left. A brown body shot out of a tree and swerved away in a long arc. Then another flash swept before my eyes. A red barb, a feathery body, seemed to lunge at me and then settle in the lowest limb of a tree a few paces away. I strained my sight in the howling maelstrom to focus on the creature. Saucily he peered at me. At last I recognized it as none other than the rosy cardinal, *Richmondena cardinalus.* There he was perched jauntily, gaping at me the intruder. The magnificence of this tiny red blob of feathers held me spellbound. His saucy carriage was admirable. A rainbow could not be more dazzling than this cardinal flaunting his pride in the blizzard. We confronted each other for a long time—he the master of the situation, I nearly blinded by the fierce snow flurries. I paid him silent homage. How could I ever forget this meeting? That such an experience could happen within crowded New York testifies to the glory of the Botanical Garden.

Although the Garden contains but two hundred and thirty acres, its aspect seems to change with every few steps so that is affords much more than anticipated. The tourist visiting the Conservatory and Museum should not imagine he has exhausted all its wealth. The parkland is full of absorbing sections appealing to diverse tastes. Each season accents one section above the others. One of these is the serenity of the Thompson Memorial Rock Garden, replete with exotic alpines arranged around rocks and pools. Next door to it is the shrunken remnant of the pristine hemlock forest, which once covered thousands of adjacent square miles. As if all the Indian spirits had retreated into this isolated sanctuary, there abides in these muted evergreens, summer and winter, an aura of solemnity.

In The New York Botanical Garden, as in every place where Nature's subtlety dwells, a thoughtful man finds beauty. Thus on a temperate day of January, I walked the river path upstream between the south gate and the new arch bridge. Not a soul was about —solitude is not a condition easily attained in the big city. The black noise-

less water of the river glided by the snow-white margins of the land with a musing quality. Paddling along one edge was a motley group of water fowl —a pair of snow geese and mallards and a lone Canadian goose. In this placid setting just we six moved—yet it was sufficient. Peace had come down from Olympian heights and nestled between these ravine-like folds. I drank in nature's purity. The world was serene; the waters went by without treacherous designs. Though to the far corners of the earth unrest seethed, even up to the brim of this natural bowl, here in this corner of the Garden, the spirit of peace reigned. How happy the heart that can count these rare moments of tranquility.

Whether we come to The New York Botanical Garden to breathe the fresh air our bodies need, to experience the uplift of the wholesome complex of the outdoors, or to enjoy the harmonious panorama of unspoiled nature, the profit is all ours. Yes, the hidden presence of the Garden in memory will bring a secret smile as we crouch behind mercenary tasks or go about humdrum chores. We are reminded of and agree with Wordsworth's lines:

> For oft, when on my couch I lie
> In vacant, or in pensive mood,
> They flash upon the inward eye
> Which is the bliss of solitude.

FLORIDA'S FAME (from page 26)

size and shape and color, to taste the difference in their flavor, and then to participate in the instructive lectures given by expert scientists, horticulturists, and commercial growers, reveal the high status of the mango industry in the state.

What a task, indeed, to develop new varieties for the market. The method of hand-crossing two parents with several desirable qualities is recommended in order to incorporate the desired characters of each parent. But hand-crossing is an intricate practice. Because of the inherent nature of the mango, thousands of pollinations must be made to obtain only a few fruit. In a special experiment out of 12,703 hand-crossed mangos only forty-five fruit were obtained, and of these forty-three were chosen for discussion, with the disappointing result that not a single fruit was found worth propagating. Such are, however, not only Florida's problems. The problems are the same, wherever mangos grow, no difference if the history dates back one hundred or four thousand years.

Reports from India show that growers there have not achieved realization of all their hopes. Their main efforts are directed towards attaining flavor and high quality of flesh of the mango, with not so much stress on color. They are intensely occupied in developing a variety of an everbearing edible mango. What an achievement that would be! So far they have succeeded only in producing everbearing mangos that will not ripen under any condition, though they can be used in cooking, for pickles and in chutneys. They are too acid for the taste to be eaten uncooked. How soon an edible everbearing mango will be cultivated, no one can guess.

Florida's mango varieties come from India, from the Philippines, from French Indo-China, from the West Indies and South America. While commercial growers have to battle diverse problems, the dooryard gardener is better off. He is not troubled about having to produce the attractive red cheeks for home consumption, nor has he to solve shipping problems on a large scale. He is free to follow expert advice and plant the choice mangos from the Philippines or Indo-China. They are the more reliable bearers, and 'Saigon,' for instance, a highly esteemed mango, generally comes true to seed. Not so India's varieties. But no one ever saw color in the 'Saigon' mango—this is the main reason it is limited to the home grower. He at least will enjoy this superior eating mango that bears as well as any other type of fruit. Only winter rains may harm it, and that not more than it harms all other mangos.

Botanically, the mango is a member of the Anacardiaceae family, a close relative of another promising tropical summer fruit grown in Florida, the cashew. The Anacardiaceaes are inconspicuous bloomers. Late in winter flower clusters cover the trees and then with necessary dry weather fruit will set. From late in May through the summer until late in fall, mangos are harvested.

Mangifera indica is the botanical name for mango; *Anacardium occidentale* is the botanical name of the cashew; other related fruits are pistachio *(Pistacia vera);* ambarella *(Spondias cythera);* yellow mombin *(Spondias mombin);* red mombin *(Spondias purpurea);* imbu *(Spondias tuberose).* Several ornamental trees and shrubs of this family, such as Brazilian pepper-tree or Florida holly *(Schinus terebinthifolius)* and poison ivy *(Rhus toxicodendron)* are well known but should be posted for people who are susceptible to these plants' exudate matter.

When it comes to recommending ornamental trees of this family, why not a mango? What more beautiful, evenly shaped, evergreen tree can be conceived that a mature mango?

"If this tree never would bear a fruit," an old Floridian said, pointing to his mango tree of honorable age, "I should nurse it along right at the spot where it came up as a volunteer. No better shade tree, no better sanctuary for birds. Nature made it a sturdy tree to protect against the tropical sun and the blowing winds. No man could do better."

The same wisdom applies to Florida's climate—"No man could do better."

CHRYSANTHEMUM CULTURE (from page 24)

pretty well worked out. You must consider how many plants you have space for and when to plant them; new plants must be ordered to be delivered a week or ten days before planting time; note made to buy spray chemicals and fertilizers.

If plants have no mulch over them, keep an eye on them throughout the winter months and especially so during warm periods, following freezing temperatures, for it is at this time that most plants are lost. Press down on any cracks that may be seen in the soil and any heaving that may be indicated—these are the signs that winterkill plants.

Prepare garden flats and fill them with a rooting medium; clean building sand can be bought at a lumber company at a reasonable price.

A cool window in the house, or a protected porch, is a satisfactory place to put cuttings where they may be shaded from the sun and protected against rain and heavy winds. A lean-to, made out of two by two lumber and covered with plastic, is an excellent place for cuttings. Have the top slanted so rain can run off. If exposed to sun, add additional material to break up the sun's rays.

To Be Continued

BOOK REVIEWS

THE LITTLE BULBS. Elizabeth Lawrence. 248 pages, indexed. Criterion Books, New York. 1957. $4

As a lover of all bulbs this reviewer had a more than happy time in reading what Miss Lawrence has to report from her two gardens and from her exchanges of notes with others, chiefly Carl Krippendorf who lives and gardens in southern Ohio. He also has the advantage of having seen both the Raleigh and the Charlotte garden, though not that of Mr. Krippendorf. Still further he has the advantage of having grown almost every one of the plants mentioned either in his Takoma Park, D.C., garden or his present garden in Pass Christian, Mississippi.

This book is quite unlike most of the garden books which pour out in a spate of "creative writing" these days, and represents the findings of many years of gardening, rather than the glib pronouncements of a "project in writing." It is almost unique in that the word "dramatic" does not appear, that favorite word of the breathless and ignorant!

The book has already been praised in all quarters for what it is, due reference being made to the several influences that mark its style, all of them excellent and in the best traditions.

What this reviewer has not seen in any review is notice of the fact that any one who has a mind to do it, can find rare and unusual bulbs and can learn to grow them if he truly wishes to do so. The commonly met complaint that is offered as an excuse for the routine garden combination, cannot stand, for the plants can be had. The other point that has not been stressed enough, if at all, is the fact that in the book we have a sound report from a new area in these United States. The older one grows the more he values reports from many places in order to get a full picture of a plant's behavior. The descriptions of most plants can be found in a good library, if one reads! The thing that cannot be found there in most instances is a report that approximates a report that might come from the area where one lives and gardens.

The reviewer's only regret is that there was not included in the book a concise report on the year-round climate of that part of North Carolina, and an equally brief statement of the soil as the author found it when she began, for there are notes with dates about frosts, and there are notes about additions of sand or peat or whatever. Since Miss Lawrence in her preface gave no indication that she intended either of these things, not she but the reviewer must be taken to task for mentioning them.

The bulbs included are bulbs in the broadest sense of that term, including corms, roots, and some tubers. The species and their clones or several hybrids are chosen with actual size of the developed tops as the measure. Even a few over-sized plants are allowed in!

The text is not wearied with quotations from many books and bulletins, but such as are there are to the point and should lead the reader on to other findings for himself. There are one or two good sources that are not mentioned at all, and there are one or two gardeners quoted, whom this reviewer would always doubt! But no matter, if the advice worked in Charlotte or Raleigh, wonderful! There is a minimum of poetry and thank Heaven we are spared Amiel's wistful Journal.

In one sense of the word, this is a reference book; in another, it is better a testament of good gardening. It has to do with plants, and their culture, but very little in regard to their use in the garden scene except in the passages citing Ohio, and a few references by inference. It is not in the category of a textbook though one learns much, nor is it one of the current "Do-it-yourself" books, though one might well learn of that, too.

If one had to define it, it is perhaps best described as a beautifully written book, literate and witty, filled with appreciative descriptions of plants that have been grown by the writer, not just once but for years, with their comings and goings. It is like some of the modern novels, however, in that for some passages, the reader is left to draw his own conclusion after the evidence has been offered, a treatment that will annoy the too literally minded and delight and provoke the rest to action.

All kinds of bulbs are mentioned and treated, and there is even a short chapter on bulbs in pots if you wish to carry your labors into the cold. Frankly, it is the kind of book that you read at your peril, if you are at all enthused by writing that is fine, about plants that have beauties peculiar to themselves and being small allow one the kind of garden development in beauty that the maker of cloisonné found in his small scale work or the embroiderer could put into a fine tapestry or petit point.

B. Y. MORRISON
Pass Christian, Mississippi

THE TROPICS. Edgar Aubert de la Rue, Francois Bourliere, and Jean-Paul Harroy. 208 pages, illustrated in color and black and white; indexed. Alfred A. Knopf, New York. 1957. (Printed in France.) $12.50

The many facets of tropical Nature, from sea level to perpetual snow, from desert to rain forest, are strikingly portrayed in this lavish book. Both the well-written interesting text and beautifully reproduced photographs combine to give a vivid picture of the worlds aequatorial regions. The illustrations, printed in France, include 130 black-and-white photographs, 34 full-color plates, and numerous line drawings.

De la Rüe, a geologist, has written the major part of the text, on the environment and plant landscape. His coverage includes climate, soils, and the various plant communities, including the rain forest, aquatic vegetation, savannahs, deciduous forests, desert plants, and mountain floras. Bourlière, a zoologist, contributes a section on animal life, with emphasis on its relation to the plant communities. Harroy, a specialist in conservation, closes with a discussion of man's relation to the tropical environment and an eloquent plea for wise land use and correction of widsepread current depradations.

A minor criticism of the book may be appropriate. Although the senior author admits his lack of botanical background, surely the text should have been reviewed by plant taxonomists. The following sampling of errata, confined to the text discussion of the neotropics, illustrates this deficiency:

Hylaea, the great Amazonian forest, is consistently called "Hileia."

Dobzhansky, a geneticist, is quoted (page 51) as identifying numerous tropical trees. The identifications actually were all made by botanical personnel of the Instituto Agronomico do Norte, Belém, Brazil.

The citation (page 53) of the Melastomataceae as a family especially rich in epiphytic species certainly is not true for the New World (to which the bulk of the family is endemic).

The "most notable stranglers" (page 54) of the American tropics are not of the genus *Clusia* (which has a few vining species), but rather, as in the Old World, species of *Ficus*.

While one saprophytic species of Gentianaceae is claimed (page 59) for the tropics, Sandwith in 1931 listed six such species for British Guiana alone.

The well-known large cypress of Mexico is named *Taxodium mucronatum*, rather than the later synonym, *T. mexicanum* (page 149).

The Mexican vernacular name for *Pinus* is *ocote*, and not *Ocotea* (page 111) which is the Latin name for a genus of Lauraceae.

The common large Andean bromeliads are universally placed in *Puya*, and not the synonymous *Pourretia* (page 112, 174-175).

Espeletia grandiflora (page 112) is a species confined to the Bogota region of Colombia; the only Ecuadorian species is *E. hartwegiana* Cuatr.

Eichhornia Smithii is a *nomen nudum*, first published on page 149 of THE TROPICS. According to E. J. Alexander, the species here is almost surely *E. crassipes* (Mart.) Solms.

Arundo nitida (page 187) is placed by all grass taxonomists in the genus *Cortaderia*, as *C. nitida* (H.B.K.) Pilger.

For those whose tropical appetite is whetted, the major deficiency of THE TROPICS is the lack of at least a selected bibliography. Actually, the above criticisms are minor flaws, emphasized only by the overall perfection and stimulation of a book which should be the Christmas gift *par excellence* to anyone even casually interested in plant life.

J. J. WURDACK

AN INTRODUCTION TO THE BOTANY OF TROPICAL CROPS. Leslie S. Cobley. 357 pages, illustrated, indexed. Longmans, Green & Co., New York. 1956. (Printed in Great Britain.) $7.25

For the reader whose botanical interests lie somewhere between the strictly scientific and the purely popular, Leslie S. Cobley's AN INTRODUCTION TO THE BOTANY OF TROPICAL CROPS provides a choice addition to his personal reference library. And this despite the fact that the book was "mainly designed for use as a textbook by agricultural students." The very readable text is enlivened by excellent black and white photographs and illustrative line drawings that might well serve as inspirations for a designer of textiles.

The classification of the various tropical crops as cereals, fibres, oil-seeds, pulses, root crops, spices, beverages and drugs, fruits, vegetables, rubber, and essential oils is botanically artificial, as the author frankly admits, but it offers convenient and unconfused packaging of information for the general reader. For the serious student it provides "appreciation of the inter-relationships

of the different families . . . and of the evolutionary trends exhibited by such a system," as well as "a framework for a botanical survey of the tropical crops."

Anyone who has traveled even briefly in tropical lands will find in Mr. Cobley's book a pleasant—and reliable—aid in dispelling his ignorance about such every-day tropical flora as the banana, the sweet potato, castor oil and India rubber, to say nothing of pawpaw and tung oil and agave. The housewife, too, who uses so many tropical products in her kitchen (often unwittingly) will discover fascinating information in Mr. Cobley's pages about cinnamon and cloves and rice and dates and tea, to mention just a few of the things which the world's warm countries have added to man's menu.

A journalism professor of my acquaintance sends his students to his university's Ph.D. theses for non-fiction topics. He maintains that a wealth of stimulating material lies buried in these learned documents, needing only an understanding mind and a facile pen to unearth it for the intelligent layman. In his chosen field Mr. Cobley has both that mind and that pen. We could use more writers like him.

ELSIE A. PARRY
New York, N. Y.

A NATURALIST IN PALESTINE. Victor Howells. 180 pages, illustrated, indexed. Philosophical Library, New York. 1957. (Printed in Great Britain.) $6

Without any doubt this is the most fascinating book on the natural history of the Palestine area that it has been my pleasure to read. The first-hand accounts of birds, turtles, fish, mammals, insects, and reptiles are unforgettable. It is unfortunate that more attention was not paid to the plants. Many people regard Palestine as a barren land, with little interest to the naturalist, but no one can persist in such a belief after reading this book!

One can only regret that the editorial work on the text was so poorly done—with plural subjects preceding singular verbs, lower-cased generic and family scientific names, "specimens" used for species, scientific family names sometimes italicized and sometimes not, and the pronoun "who" used continually to refer to animals. Surely errors like "more denser," "quietened," "fields and marches," "had woken up," "fish laying dead," and "who to fly after" could and should have been corrected by an alert editor. The zoologist will be amazed to learn that the scorpion is an "insect," that cicadas make their sounds by rubbing their hind legs "against the abdomen," and that tadpoles are "fish," while the botanist will raise his eyebrows at expressions like "fronds of the prickly pear" and statements like "the tamarisk tree is an acacia." Anyone interested in accuracy of speech will deplore such repeated expressions as "insects and animals," "animals and birds," and "animals and insects," while the statement on page 27 that the eagle owl "lives on any small mammal from a desert hare to a reptile" is inexcusable.

Misspellings of names are frequent: "*Nerium orleander*" for *oleander*, "avocat" for avocet, "gallinula" for gallinule, and "*Felco*" for *Falco*. The excellent drawing on page 43 of an acacia is labeled a "tamarisk;" while figure 15 opposite page 81, labeled "Pelicans in the Huleh swamps," actually shows nineteen spoonbills and only three pelicans. It is sincerely hoped that these minor deficiencies will be corrected in a new edition of an otherwise very splendid work.

H. N. MOLDENKE
Director, Trailside Museum
Watchung Reservation, N. J.

BACKGROUND TO GARDENING. W. O. James. 224 pages, illustrated by B. E. Landon and the author; indexed. Pitman Publishing Corp., New York. 1957. (Printed in Great Britain.) $4.50

This book contains valuable and up-to-date information on the way plants get their living, and the factors which affect their growth in the garden, and it is presented in a most readable and entertaining manner.

Fresh Air and Sunshine, Water, Inside the Soil, Invisible Means of Support, are most enlightening chapters of what goes on "behind the scenes," as it were. The chapter on Debatable Operations rather questions all the advantages that have for a long time been attributed to such routine work as digging, hoeing, potting on, and transplanting. What a discussion this chapter would stir up at a Gardeners' Association meeting! It would be nice to get as good results with less work than the old-timers loved to perform.

The effect of hormones on encouraging growth in some cases and inhibiting it in others is clearly shown. Concluding chapters deal with The Control of Flowering, and Seeds.

HENRY E. DOWNER
Poughkeepsie, N. Y.

PLANT PROPAGATION. John P. Mahlstede and Ernest S. Haber. 413 pages, illustrated, indexed. John Wiley & Sons, New York. 1957. $7.50

This book illustrating very clearly all major forms of plant propagation, is the kind of book long awaited by both professional and amateur plant propagators. It not only discusses the propagation of many common plants, but describes, also, the propagation of many unusual ones.

The propagation of plants from seed, their origin and development, collection, extraction, and storage are covered thoroughly. The different pretreatments necessary to insure good germination are listed, along with the manner in which the seeds may be stored and the length of time each type will remain viable.

The rooting of both hardwood and softwood cuttings from either deciduous or evergreen plants is presented clearly and concisely. Humidification methods for keeping softwood cuttings from wilting are discussed, in addition to a complete coverage of the rooting hormones and media used. Some of the most recent propagating structures are listed, with their construction, operation, and advantages thoroughly covered.

Grafting, along with the various types of understocks used—a point on which most books on plant propagation are weak—is discussed thoroughly. A long list of rootstocks is given, together with the plants with which they are compatible. In addition to this, the manner in which each is used, i.e., budding, grafting, is indicated—a point which has not been clearly illustrated in the past.

In concluding the book, the authors have compiled three tables entitled: "Propagation of common conifers and broad-leaved evergreen trees, shrubs, and vines;" "Propagation of common deciduous wood trees, shrubs, and vines;" and "Propagation of common herbaceous plants," in which they list the many techniques by which plants in these categories can be propagated, along with the time of year the operation should take place.

ROGER COGGESHALL, *Propagator*
Arnold Arboretum
Jamaica Plain, Mass.

THE U.C. SYSTEM FOR PRODUCING HEALTHY CONTAINER-GROWN PLANTS. Kenneth F. Baker (editor). 332 pages, illustrated. University of California College of Agriculture, Berkeley. 1957. $1

This most comprehensive soft cover book explains the so-called U.C. System of plant culture developed by agricultural scientists at the University of California over the past fifteen years. It describes the various soil mixes, soil and plant treatments, and handling operations for producing healthy container-grown plants. The U.C. System is designed practically to eliminate the principal causes of plant failures—diseases caused by organisms and by unfavorable soil factors. Dr. Kenneth Baker, one of America's outstanding pathologists of ornamental plants, not only edited the book but contributed about half of the chapters as well. His treatment of methods for treating soil with heat and chemicals is the most up-to-date and best this reviewer has seen.

The major part of the book is usable by nurserymen, florists, and other plant growers over the entire country. Some chapters, for example, the treatment of Salinity in Soils, apply primarily to growers in the West and Southwest. One chapter which will be most widely used is that describing the U.C. type soil mixes by O. A. Matkin and P. A. Chandler. In order to save wear and tear of this part of the book, the California Agricultural Extension Service also

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has printed the information in this chapter in a separate leaflet, No. 89, which may be obtained free by writing to Agricultural Publications, 22 Giannini Hall, University of California, Berkeley 4, California. The book itself is not available in book stores but can be purchased for one dollar postpaid by writing to the Berkeley address given above, or from Book Service, The New York Botanical Garden, Bronx Park, New York 58, N. Y.

P. P. PIRONE

ORCHIDS FOR EVERYBODY. Lee Wickham, with Jean and Sam Hopley. 63 pages of text; 30 black and white photographs. Robert M. McBride Co., New York. 1957. $5

This book by Lee Wickham, with Jean and Sam Hopley, cannot be recommended to anybody interested in a scientific botanical work. It is very simply written, certainly not technical nor scientific, and yet is not interesting from a narrative standpoint. It is difficult to understand how the publisher allowed the misspelling of a generic name to appear numerous times throughout the book. There is one relatively nice color plate, but the parentage of the flower pictured is stated as "a cross between a New England Arethusa and an Oriental cousin;" certainly not a scientific designation of an orchid hybrid. The plates that follow the text are in general very poor, most indistinct, and are not worthy of being printed. Fortunately the book is very brief, and should anybody feel inclined to read it, it can be accomplished in a very short time.

From the standpoint of orchidology, botany and science the only chapter of the book that could be considered worthy of reading is the fourth, some ten pages long. This chapter would probably be of value to those interested in germinating seed of native orchids of the United States.

The introduction and first three chapters are more of psychiatric or religious interest than botanical. It is difficult to understand why the author included the thoughts expressed in these pages in a book entitled "Orchids for Everybody."

WILLIAM W. WILSON, M.D.
Wynnewood, Pa.

SEVEN KEYS TO DISTINCTION IN FLOWER ARRANGEMENT. Anita Stelle. 127 pages, illustrated, with photographic commentary by Margaret Dodson; indexed. Hearthside Press, New York. 1957. $3.50

Many books touch on distinction but this author has created a much needed treatise on the subject. The importance of distinction is impressed upon the reader in seven well-handled detailed approaches. From the standpoint of these approaches, there has been added an informative and interesting commentary to each photograph. Throughout the book many noted arrangers, lecturers, and judges have expressed their views on distinction and originality.

From the viewpoint of an exhibitor and accredited judge of flower shows, the calibre of our shows would score much higher if the many arrangements though mechanically well-done had the elusive quality of distinction. There has been added an eighth chapter devoted to arrangements at the flower show. This chapter is an important one and could be the means of raising an exhibitor's work from the commonplace to that of the "blue ribbon" winner.

This text is stimulating and, I believe, would school an arranger to acquire vision in the all-important quality—"distinction in flower arrangement."

MARGARET DEL. GRUMBINE
Jersey City, N. J.

YOUR OWN BOOK OF NATURE AND GARDEN FUN. Ernestine Sabrina Coffey and Dorothy Fitch Minton. 63 pages, illustrated (drawings by Jane Reynolds Crow). Hearthside Press, New York. 1957. $1.75

This is an attractive small volume intended for children who are interested or who may become interested in projects based on the uses of plants and plant materials. It includes instructions in simple gardening, flower arranging, making dish gardens, collecting leaves, making holiday decorations, corsages, little gifts and similar activities. It is written simply enough for the average junior gardener and nature student, aged about eleven, to follow without difficulty. The illustrations are clear and fairly adequate. It should prove a worthwhile gift for a youngster.

LILLIAN WEBER

A LEADER'S GUIDE TO NATURE AND GARDEN FUN. Ernestine Sabrina Coffey and Dorothy Fitch Minton. 127 pages, illustrated (drawings by Jane Reynolds Crow); indexed. Hearthside Press, New York. 1957. $2.75

A LEADER'S GUIDE TO NATURE AND GARDEN FUN includes all of YOUR OWN BOOK OF NATURE AND GARDEN FUN described above and, in addition, a sizable section in which are discussed such topics as "Understanding the Junior Garden Club Picture," "How to Be An Effective Leader," "Planned Horticultural Programs," "Planned Conservation Programs," "Planned Flower Arranging Programs," "Planned Holiday Programs." This book should prove a helpful, all-around guide for parents, teachers, and leaders of young people who are interested in learning about plants and plant materials and what can be done with them to "have fun."

LILLIAN WEBER

GROWING FIELD CROPS. George H. Dungan and W. A. Ross. 495 pages, illustrated, indexed. McGraw-Hill Book Co., New York. 1957. $4.96

Most introductory texts in agronomy consider the distribution, culture, varieties, and so forth, of each crop in turn. GROWING FIELD CROPS departs from this organization, considering in successive chapters the various operations involved in crop production. The crops are discussed as each operation is described.

The book attempts to include a consideration of all major crops and practices in the United States, but is too brief to discharge this task altogether successfully. The diversity of climate in this country seems to dictate a regional approach to agronomy, if a text is to be held to conventional length without sacrificing clarity or completeness.

The style is informal, occasionally almost conversational. Illustrations and maps are liberally used.

People with little previous contact with farming will find this book helpful in gaining an understanding of the operations involved in producing field crops, and teachers may find the topical approach valuable in organizing class work. Technical workers in agronomy and related fields are likely to object to some of the generalizations, and to the amount of emphasis given some subjects.

MADISON J. WRIGHT
Dept. of Agronomy
University of Wisconsin

A TEXTBOOK OF PLANT VIRUS DISEASES. Kenneth M. Smith. 652 pages, illustrated, indexed. Little, Brown & Co., Boston, Mass. Second ed. 1957. (Printed in Great Britain.) $12

Although this book is called a second edition, Dr. Kenneth Smith of Molteno Research Institute, University of Cambridge, England, has rewritten and expanded his textbook. He summarizes information on three hundred plant viruses, discussing for each virus its properties, transmission, host range, and geographic distribution, with emphasis on the diseases it causes in principal host plants. This is an essential reference for pathologists dealing with plant viruses, and the many good photographs of diseases make it attractive to the general reader. The scope is world-wide, including virus diseases of many crop plants of the tropics. References are collected at the end of the book, and an index of synonyms helps the reader to find pineapple yellow spot under tomato spotted wilt and corn stunt under maize stunt.

There seem to be few errors, but Figure 67C is labelled rose mosaic when it should be rose streak.

PHILIP BRIERLEY
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Ornamental Plants Section
Beltsville, Md.

A GLOSSARY OF MYCOLOGY. Walter H. Snell and Esther A. Dick. 171 pages, illustrations by Henry A. C. Jackson. Harvard University Press, Cambridge, Mass. 1957. $5

In popular books on fungi and, too often, in supposedly scientific papers, terms are used carelessly and inaccurately and the standard dictionaries are not always helpful. Some years ago the senior author published a little book, "Three thousand mycological terms," which met with wide acceptance. The present volume is its very greatly enlarged and carefully revised successor. While intended primarily for the professional mycologist and others working on problems related to the fungi, amateur collectors and even those whose interest in the fungi is only occasional will be glad to know that there is available a scholarly and accurate source of reference to terms used in connection with these organisms.

The illustrations are clear and accurate and bring out effectively the points they help define.

G. W. MARTIN
State University of Iowa
Iowa City, Iowa

DICTIONARY OF MICROBIOLOGY. Morris B. Jacobs, Maurice J. Gerstein, William G. Walter. 276 pages. D. Van Nostrand, Princeton, N. J. 1957. $6.75

The three authors of the Dictionary of Microbiology have compiled and attempted to define more than five thousand terms of concern in medical and industrial microbiology. At the outset, one could quibble by asserting that either "unicellular" or "molds" should be deleted in their definition of microbiology as "the science of unicellular organisms that considers bacteria, yeasts, and molds."

On the whole, the chemical, immunological and bacteriological terms are more adequately and less vaguely defined than the mycological and genetic terms. Four examples from the latter group will be quoted to illustrate the lack of precision which

(Continued on page 36)

NEWS, NOTES and COMMENTS

Dr. Steere Appointed Director of The New York Botanical Garden. Dr. William C. Steere, Dean of the Graduate Division of Stanford University, has been appointed Director of The New York Botanical Garden. Mr. Charles B. Harding, President of the Garden, made this announcement at the meeting of the Board of Managers on December 12, 1957. It is expected that Dr. Steere will begin his duties as Director about July 1958. In the interim Dr. David D. Keck, Assistant Director and Head Curator, will serve as Acting Director, as Dr. William J. Robbins, the present Director, is retiring on December 31, 1957, at his request.

Dr. Steere, a B.S. graduate of the University of Michigan in 1929, earned his Master's degree in 1931 and his Ph.D. degree in 1932. He instructed in botany for two years at Temple University, then returned to Michigan as a member of the faculty in 1931 and served successively as assistant professor, associate professor, professor, and chairman of the department of botany until he joined the department of biological sciences at Stanford University in 1950.

He is a member of a number of scientific organizations and was president of the Bryological section of the International Botanical Congress, Paris, 1954, and program director of the National Science Foundation, Washington, D.C., 1954-1955. He recently resigned as editor-in-chief of the American Journal of Botany; he had served in that capacity for the past four years. He was editor-in-chief of the Bryologist, 1938-1954.

Dr. Steere has made extensive studies in the cytology and systematics of Bryophytes and their geographic distribution and has engaged in field work in Puerto Rico, Colombia, Ecuador and Alaska.

Dr. Rogerson Appointed Curator of The Garden's Cryptogamic Herbarium. Dr. Clark T. Rogerson, who has been Assistant Professor of Botany of Kansas State College and assistant mycologist at the Agricultural Experiment Station of that state for the past seven years, will assume his duties as Curator of the Cryptogamic Herbarium of The New York Botanical Garden on February 1, 1958. Following his graduation from Utah State Agricultural College as B.S. in 1940, he served as assistant plant pathologist for that state; then was appointed mycologist at Cornell University in 1946 from which University he received his Ph.D. in 1950.

A member of the American Association for the Advancement of Science, Mycological Society of America, the American Phytopathological Society, the Botanical Society of America, Torrey Club, British Mycological Society, and Kansas Academy of which he has been secretary since 1953, Dr. Rogerson's special studies have been on the parasitic fungi of Kansas and the taxonomy of ascomycetes and of the hypocreales.

Dr. Rogerson was born in Ogden, Utah, in 1918.

Paintings of Wild Flowers of the English Countryside will be exhibited at The New York Botanical Garden in February and March through the courtesy of the Shell Petroleum Corporation and the kindly cooperation of Mrs. Charles Webster of East Islip, Long Island, who made the arrangements on behalf of the Garden's Display Committee. The artists, Rowland and Edith Hilder, were commissioned by Shell Petroleum to make the paintings as illustrations for advertisements in "Country Life," "Field," and other English publications. These paintings were subsequently included in a book, calendar, and charts for school use and proved very popular in England, Canada, and the United States.

The paintings have great appeal in themselves but also serve as an example of how commercial advertising can be directed constructively to educate the public to appreciate the countryside through which it travels.

Rowland Hilder, who was born in 1905 in Great Neck, Long Island, of British parents, attended school in Morristown, New Jersey, until his father returned to England in 1915 to join the Royal Horse Artillery. At the age of sixteen Mr. Hilder enrolled at the Goldsmiths' College School of Art in London and studied under the famous illustrator Edmund J. Sullivan. His work has included book illustrations for TREASURE ISLAND, PRECIOUS BANE, and THE BIBLE FOR TODAY, and many drawings for the publicity departments of leading British firms. Many of his pictures are in permanent collections and galleries of the Commonwealth and he is a member of the Institute of Painters in Water Colours, London, England. During World War II Mr. Hilder was engaged as a camouflage officer and upon propaganda schemes for the Ministry of Information.

Edith Blankiron Hilder also attended Goldsmiths' College School of Art—that is where the two artists met—and has specialized in botanical illustrations and children's books.

Excerpts from the President's Newsletter. Fifty thousand tulip bulbs are being planted outside—twelve thousand for the spring show in the Conservatory. Seven hundred new daffodils from Ireland and England are being planted in the Conservatory Courtyard. The permanent planting in the courtyard has progressed rapidly . . . trees, hedges and big hollies have been planted.

The Volunteer Associates will use the Sylvia Maitland Memorial Fund for the new Japanese cherry collection . . .

A Camera Club is being organized by the Garden, co-sponsored by the International Flower Show. Meetings held at the Garden are open to professionals and amateurs. The International Flower Show will provide space at the Coliseum for a picture contest, with prizes to be donated by the Grand Central Camera Store.

Dr. B. A. Razi, in the United States on an India Wheat Loan Educational Fellowship under the auspices of the U. S. State Dept., worked at the Garden during November on a study of parasitic flowering plants of India . . . Dr. Alan J. Thomas of the University of North Wales is studying plant tumors in the Garden's Research Laboratories. . . . The Upjohn Company is cooperating in the building of necessary equipment for further research "on Sex Hormones of the Fungi" by Dr. Alma Barksdale in our Laboratory.

The National Science Foundation is making a grant of $30,000 for the purpose of new herbarium cases. . . .

Ultimately the Garden will receive the principal of two substantial trusts provided by the will of the late Edwin De T. Bechtel: the income from the trust to be known as the Edwin De T. Bechtel and Louise Bechtel Fund will be used to purchase books for the library; the income from the second trust for the general purposes of the library.

Retirement of Rosalie Weikert. In the summer of 1957 The New York Botanical Garden could boast two who had served it faithfully for more than forty years. Grace Schilling's retirement was noticed in the September-October issue of this magazine; now it is Rosalie Weikert's turn. Mrs. Schilling was here for forty-seven years, though not continuously; Miss Weikert's forty-five uninterrupted years must be the longest term of duty of any one in the Museum Building. (Both ladies must yield to George Freihof, who has worked at the Garden for fifty-four years.)

Rosalie Weikert was appointed Museum Aide in January 1913. She was assigned to the collections of algae and hepatics, under Marshall Avery Howe, replacing Katherine Kimball, who changed to the grasses and who later went to the United States National Herbarium in Washington.

Miss Weikert had had a course in botany at Wadleigh High School under Miss Marie Saniel, whose name will be found on some of the sheets in the moss herbarium. She had also studied Latin, which was, if not a requirement for working in the herbarium, at least considered desirable. Rosalie had always taken pleasure in knowing the wild flowers, which her mother taught her; especially when they moved from Manhattan to "the country" —the vicinity of the botanical garden in the Bronx.

She worked with Howe for twenty-four years, until his death in 1936. Her first day was spent pasting labels on herbarium sheets and stamping them; the great Mitten collection of mosses and liverworts had recently been acquired. Then Howe taught her how to mount the liverworts. They worked in the Britton Room, where the horticultural part of the library is now housed. Nathaniel Lord Britton studied his West Indian collections in the same room.

Miss Rosalie Weikert

(For a reason apparently now unknown, Rosalie was always "Isabella" to him.) Gertrude Knight Britton worked nearby, in what is now the Members' Room, on the mosses.

Dr. Howe not only showed her how to mount and label the specimens, he instructed her in classification and set her to distributing the sheets in the herbarium. This entailed the preparation of folders; an interesting side-light is the instruction given in handwriting. (To this day, I think, Rosalie has never touched a typewriter.) Later she attended some of the courses given at the Garden—she recalls especially those of Forman Taylor McLean and Elmer Drew Merrill. She helped Howe organize his extensive correspondence concerned with the purchase and exchange of specimens; those files are still a valuable part of the cryptogamic herbarium. Another of her duties was to run off on the microtome sections, many yards of them, of the calcareous algae studied by Howe. Ten slides were made for each specimen, and are still preserved in the herbarium. In 1930 her name appeared in the list of the "Garden Staff" with the title of Technical Assistant. She was a member of the Torrey Botanical Club, and one of the original one hundred and two members of the Phycological Society of America. She made independent (unpublished) studies of diatoms.

As a side line Howe introduced the culture of dahlias in the Garden. His Museum Aide and Technical Assistant found herself spending considerable time outdoors in the borders, helping to keep the records of—finally—about twelve hundred plants every season. She grew dahlias of her own at home; they took several prizes.

After Howe's death, Rosalie was for a time in charge of the algae and hepatics. In 1927 the algae, hepatics, and fungi were moved down to the second floor—where the offices of the "anthologists" now are. In 1940, the flowering plants and these cryptogams exchanged places; the latter joined the mosses and ferns under the care of Fred Jay Seaver; and Rosalie moved upstairs again, to the quarters she occupied until her retirement. In 1947 Donald Philip Rogers succeeded Seaver as curator of cryptogams, and under his direction Rosalie spent most of her time on the fungi, now the most active part of the collections.

So Rosalie Weikert has been identified with the cryptogamic herbarium throughout most of its growth. From the beginning she was enthusiastic about her work and devoted to those with whom she worked—especially to Dr. Howe. She looks back on the years with the same enthusiasm and admiration. She can tell of Dr. Britton coming daily to the Garden in his carriage; of Mrs. Britton who always walked; of parties in Murrill's house; of watching Mr. Williams fancy-skating on the lake; of the tea-room in the old Lorillard mansion; of the annual spring inspection, when the whole Garden dressed itself up with displays and exhibits; and of many other things. They were good years, and the only regret is that they had to end. Devotion to the Garden finally yielded to another loyalty. And as you miss the Garden, Rosalie, we miss you on the top floor, and shall continue to miss you, for a long time. HWR

Dahlias at the Garden. With the cooperation of Edward B. Lloyd, Secretary of the American Dahlia Society, and of Lynn B. Dudley, Past President of the Society and for over twenty-four years Editor of the Bulletin of the American Dahlia Society, the dahlia border at The New York Botanical Garden was a really fine achievement in the fall of 1957, as the following excerpts from the Bulletin of the American Dahlia Society testify.

"After some fourteen years the dahlia border planted this year by The New York Botanical Garden is a wonderful display. It is a representative planting of some of the most popular dahlias originated in America and foreign lands.

"There are over two hundred hills and their culture, under the direction of L. P. Politi, Head Gardener, and John King, Assistant Head Gardener, was excellent. Mrs. Hansell, Editor of The Garden Journal of The New York Botanical Garden, was also instrumental in getting this dahlia garden to resume operations.

"The blooming season was late due to delays in getting the plot ready. The hills were arranged with ample space between, and most of the varieties were plainly labeled so that the thousands of visitors, who view the garden, may learn the names of those which they like best. The varieties grown are in all types from the small singles, collarettes, miniatures, and pom pons up to the medium and large cactus, informal and formal decoratives. One of the most spectacular portions of the garden was a row of seven bicolors named 'Town Topics,' a B size, scarlet with white tips. These were about seven feet tall.

"A partial list of the other varieties follows: 'Tiara', 'House of Orange', 'Orange Princess', 'Rhythm', 'Red and White', 'Pride of Holland', 'Terpo', 'Margaret Rose', 'Belle Dame', 'First Lady', 'Michigan White', 'Jane Lausche', 'Pink Giant', 'Jersey Beauty', 'Pride of Parkersburg', 'Ruth Alampi', 'Dueill du Roi Albert', 'Dora McCann', 'Five Star General', 'Allegresse'. Among the small varieties were: pom pons—'Lemon Gem', 'Betty Lou', 'Margaret Williams', 'Betty Malone', 'Honey'; miniatures—'Little Rachel', 'Louise Ann', 'Hi Jack', 'Tacita', 'Hestia', 'Lilliane Ballego', 'Mamie', 'Decoy', and 'Cristine Valsecci'.

"Anyone interested in dahlias should see this spectacular and colorful border, which is really a large crescent. We understand that it will be continued in the season of 1958, so if you do not get there before frost gets them, be sure and see it next year. If the late Dr. Marshall Howe, the originator of the dahlia border at the Garden, could have seen this year's border, he would have been proud of it."

The dahlias came from Adrian Frylink & Sons, Sassenheim, Holland, Comstock Dahlia Gardens, San Diego, California, Gamston Gardens, River Vale, New Jersey, Rock River Dahlia Gordens, Columbia Station, Ohio, Ruschmohr Dahlia Gardens, Rockville Centre, Long Island, and from Mr. Dudley. The collection of thirty-five varieties presented by Mr. Dudley included some dahlias on the market for the first time this year.

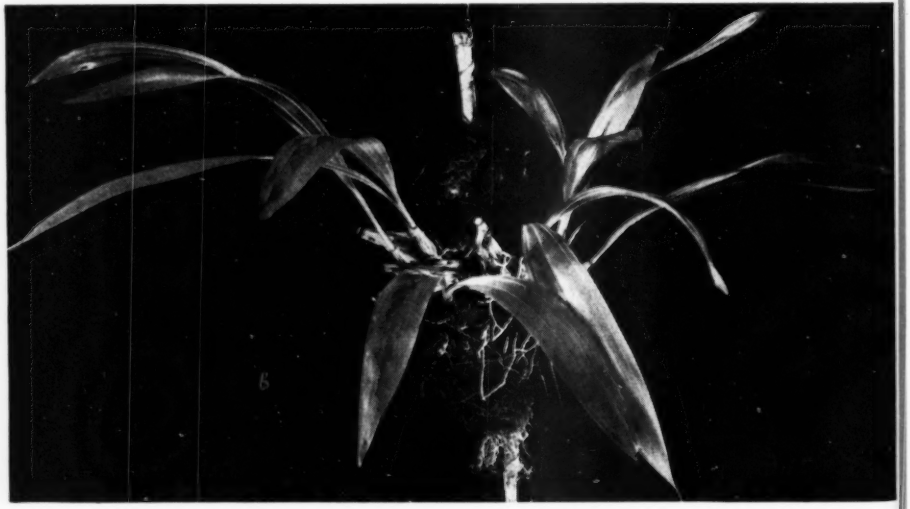
Coryanthes (affinitas) macrantha was discovered in 1828 in Caracas, Venezuela, by David Lockhart, then Supt. of Trinidad Botanical Garden. It is native to Venezuela and Guiana, an epiphytic orchid similar to stanhopea and requiring the same warm house treatment.

The leaves are oblong-lanceolate, narrowed at both ends and about a foot long. The flowers are up to six inches long—the petals dull pink with a few red blotches near the base, the sepals are flesh-colored and speckled with red. It is a very spectacular flower.

The plant at The New York Botanical Garden was collected at Ayanganna, British Guiana, in 1955 by Dr. and Mrs. Bassett Maguire, and its flowering which is looked forward to this year, will be quite an achievement as it is reported not to have flowered under cultivation in many, many years.

Darwin, in his book, ON THE FERTILISATION OF ORCHIDS BY INSECTS (1884) relates how the flowers of coryanthes are fertilized—in a manner that would have seemed "utterly incredible had it not been repeatedly witnessed" by the late Dr. Crüger, Director of the Botanical Garden at Trinidad:

"The flowers are large and hang downwards. The distal portion of the labellum is converted into a large bucket. Two appendages, arising from the narrow base of the labellum, stand directly over the bucket and secrete fluid"—"limpid and so slightly sweet that it does not deserve to be called nectar," "nor does it serve to attract insects." "When the bucket is full, the liquid



This plant of *Coryanthes (affinitas) macrantha*, brought back from British Guiana by Dr. Bassett Maguire in 1955, is expected to flower at The New York Botanical Garden this year.

overflows by the spout." "The spout is closely over-arched by the end of the column, which bears the stigma and pollen-masses in such a position that an insect forcing its way out of the bucket through this passage would first brush with its back against the stigma and afterwards against the viscid discs of the pollinia and thus remove them."

"Dr. Crüger states that the bees may be seen in great numbers disputing with each other for a place on the labellum. Partly by this contest, partly intoxicated by the matter they are indulging in, they tumble down into the bucket, half full of a fluid secreted by organs situated at the base of the column. Then they crawl along in the water towards the anterior side of the bucket, where there is a passage for them."

The bumble bee, in forcing its way out of its involuntary bath, has to exert itself considerably. The first bee, which is immersed, will have the gland of the pollen-mass glued to its back.

"'The insect gets through the passage and comes out with this peculiar appendage to return immediately to its feast when it is precipitated a second time into the bucket, passing out through the same opening and so inserting the pollen-masses into the stigma while it forces its way out, thereby impregnating either the same or some other flower.'

"There cannot be the least doubt that the fertilisation of the flower absolutely depends on insects crawling out through the passage formed by the extremity of the labellum and the over-arching column. . . The fluid is secreted by the appendages not as a palatable attraction for the bees but to wet their wings and then compel them to crawl out through the passage.

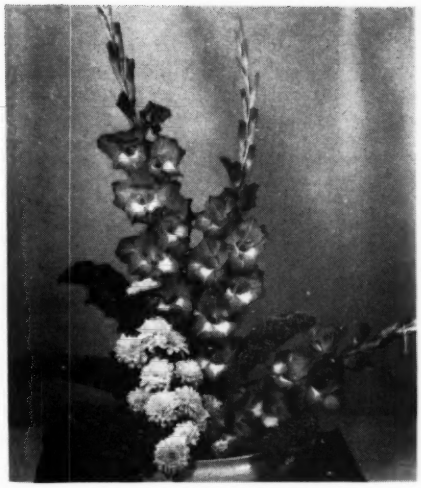
"Without their aid [insects] not a species of the twenty-nine genera examined by me would set a seed."

Holly Society of America. The twenty-third meeting, held at "Longwood Gardens," Kennett Square, Pennsylvania, on November 7 and 8, 1957, brought together the largest number of members and guests in the ten years of the Society's history. Such a delightful two-day conference—friendly, informal and informative.

During the first afternoon guided tours around the grounds and through the conservatory were conducted by members of the staff of "Longwood Gardens." One young woman from North Carolina, on entering the main display house and seeing the beautiful chrysanthemum show in that house and the auditorium, caught her breath and exclaimed, "So much beauty. I can't take it in all at once." In the adjacent azalea house the Japanese varieties, imported last year by "Longwood Gardens" in cooperation with the U.S.D.A., were exhibited for the first time.

Following the banquet in the beautiful ballroom, with Mr. C. R. Wolf, President of the Society and Mrs. Wolf, Dr. George T. Avery, Vice-President of the Society and Director of the Brooklyn Botanic Garden, and Mrs. Avery, Dr. Russell J. Seibert, Director, and Dr. W. H. Hodge, Head of the Department of Education, of "Longwood Gardens," seated at the head table, Professor Robert B. Clark, of the Department of Ornamental Horticulture of Rutgers University, gave an illustrated talk on "Hollies in Europe."

At the business meeting the next morning, Mr. Wolf and Dr. Avery were re-elected to office and reports were presented



'Emperor' is the only variety selected as the 1958 All-America gladiolus. It has vigorous foliage and tall majestic spikes with seven to eight of the round, recurved florets open at one time. The flowers are of a royal purple color with white throat. 'Emperor,' an origination of Carl Fischer and Ralph Boerman, has all the qualities of an all-time garden favorite, being robust, and has already distinguished itself on the show table as a seedling.

The four previous All-America award winners, gladiolus 'Royal Stewart,' medium red; 'Apple Blossom,' pink and white, 'Caribbean,' ruffled blue and 'Maytime,' deep pink with white throat, were grown in the gladiolus border at The New York Botanical Garden this past summer.

In 1957 the number of All-America trial gardens located coast to coast, in the United States and Canada, with varying climatic and soil conditions, was increased from thirty to thirty-five.

by the several committees: Membership—884 members, 654 active, 234 sustaining in 33 states, Canada, Denmark and England; Diseases by G. Fillipo Gravart, who is a plant pathologist with the U.S.D.A. Station at Beltsville, Maryland; and Insects by Dr. Clyde C. Hamilton, Research Entomologist of the New Jersey Agricultural Experiment Station, were reported briefly as they had been adequately covered in the "Holly Handbook." Dr. Hamilton read a letter from Warren Johnson of the University of Maryland on the work being done there on holly insect pests, with particular respect to the use of "Systox," which may result in damage to bark and cambium of American and English hollies. It was recommended that the trunk banding method be continued only on an experimental basis until more data on phototoxicity is obtained. The soil drenching method continues to prove satisfactory for leaf miner control (See Cory and Highland: Control of Some Pests of Ornamentals. 1957. Jour. Econ. Ent. 50 (1) 86-89 for details).

Daniel J. Fenton, Program Chairman, announced that the spring 1958 meeting may be held at Rutgers University, if the new Horticulture Building is completed, or at Goucher College, Towson, Md.; the fall 1958 meeting in Richmond, Va., and the spring 1959 meeting at the University of Delaware.

In the report on Arboretums presented by Dr. John Wister, Director of the Arthur Hoyt Scott Horticultural Foundation at Swarthmore, it was stated that there will be an exhibit at the International Flower Show, of the relative values of the species and varieties of hollies in the eastern area.

In the finance report Donald Wyman stated that $5,008 had been pledged, $4,560 paid to date toward the goal of $12,000 for the research project being conducted at University of Delaware. Dr. Harry Dodge, chairman of research, stated that whether his interest in holly be amateur, commercial, purely intellectual or scientific, every one will agree that the research program in holly at Rutgers under Professor Clark and at University of Delaware under Dr. Charles Dunham are altogether worthwhile and should be supported.

Mr. Clark spoke briefly on the oxygen needs of holly now being studied at Rutgers. The one hundred plants donated by Mr. Wolf were carefully selected for uniformity: the soil, Washington silt loam, came from Hunterdon County, New Jersey, and the containers were deep and self-irrigating with continuous supply of water through the two-foot vitrous tile in the benches, actually a pool of water coming out by capillary action through the surface. The soil had been screened into four different sizes, one being left natural as a check, and had passed successively through screens until one was almost like powder. The plants were planted the last week of July during a period of high temperatures so had to be shaded for protection from direct sunshine. Weekly measurements of growth were taken so Dr. Clark has record of the plants' behavior since the fourth week of August. The best growth was observed in the finest soil; in the coarsest and next coarsest the plants are not doing so well, though it had been expected that the plants would make the best growth in these soils; unable to account for it, the plants in medium fine soil are doing remarkably well.

Dr. Charles Dunham outlined the first steps of the planned three-year holly research program at the Universoty of Delaware, sponsored by the Holly Society of America, from which basic recommendations will be accumulated that can be used in later field work and in other parts of the country: 1. nutrient deficiency symptoms; 2. sand cultures with varying nutrient solutions; 3. pot cultures in soil to study effects of soil pH on nutrient requirements—this third phase to be initiated in spring 1958.

In the afternoon session, Dr. Ray R. Hirt, Senior Professor of Plant Pathology of the College of Forestry, Syracuse University, discussed growing "Holly in Containers" (see page 12 of this issue for Dr. Hirt's talk); Harry W. Dengler of the Maryland Extension Service, "Handbook of Hollies;" and Dr. William J. Hann, of the Soils Department of Rutgers University, "Fertilizers for Holly."

American Rose Society. At the Society's annual convention, held in Old Point Comfort October 10-14, 1957, at Richmond, Virginia, Dr. Walter E. Lammerts of Germains, Inc., Los Angeles, received the Gertrude M. Hubbard Gold Medal Award as the originator of rose 'Queen Elizabeth.' This is the second time Dr. Lammert has been presented with this coveted award of the American Rose Society, which is awarded once every five years to the originator of the best American rose during that period; the first time in 1945 for rose 'Charlotte Armstrong.'

Rose 'Queen Elizabeth' has also won other high honors—the gold medals of the Japan Rose Society and of the National Rose Society of England, and the President's Trophy of the latter Society; and an "All-America" rating in 1955 by All-America Rose Selections.

Frank Spanbauer, Decatur, Illinois, was presented with the John Cook Medal for his greenhouse rose 'White Butterfly.' Robert V. Lindquist, Hemet, California, and Eugene S. Boerner, Newark, New York, shared honors in receiving the David Fuerstenberg Prize (income from $1,000) for rose 'Tiffany' and rose 'Spartan', respectively—"new roses of American origin suitable to the American climate which deserve honor." Since the prize was established in 1933, roses 'Fashion,' 'Tallyho,' 'Mary Margaret McBride,' 'Charlotte Armstrong,' 'Eclipse,' 'Doubloon,' 'Vanguard,' and 'Leonard Barron' have been so honored.

At the National Rose Show, held in the Chamberlin Hotel's roof garden, the Milton S. Hershey Memorial Trophy was won by Harold Weaver, Basil, Ohio, for his exhibit of 'Valiant,' 'Blanche Mallerin,' 'Confidence,' 'Chrysler Imperial,' 'Poinsettia,' and 'Eternal Youth;' while Ralph Fenton, Lancaster, Ohio, won the J. Horace McFarland National Memorial Award for his display of 'Crimson Glory,' 'Valiant,' 'Burnaby' and 'Mrs. Sam McGredy.'

American Horticultural Council Awards. Among those to be honored by the Council at its meeting in Denver, Colorado, last fall were Dr. Francis A. Bartlett, Stamford, Connecticut, for "a lifetime devoted to the care of trees;" Dr. Harold Bradford Tukey, Michigan State University, for his many contributions to horticulture, including "experiments in the use of radioactive isotopes which have contributed substantially to our knowledge of nonroot plant nutrition;" and Edwin A. Menninger, Stuart, Florida, for devoting a great part of his life "toward gathering knowledge about ornamental plants of the state of Florida" and "thus inspiring the public to develop more beautiful Florida through carefully planned landscaping." Dr. Menninger's name is familiar to readers of The Garden Journal as author of several articles in past numbers and as reviewer of books in more recent numbers.

Word from B. Y. Morrison. "What word do you have from B. Y. Morrison?" is frequently asked the Editor, who is happy to reprint excerpts from a recent letter received from him. Mr. Morrison, now living in Pass Christian, Mississippi, was for many years identified with the Bureau of Plant Introduction, U.S.D.A., The National Arboretum, and the American Horticultural Society:

"My garden is lovely right now, with the wonderful lawns after what is probably their last clipping, the pecans overhead with enough yellow in the green to suggest oncoming autumn, the old tea roses in splendid flower, and azaleas in bloom on all sides. These include my own and some of the best Japanese sorts. No bulbs other than *Gloriosa superba,* that is making its declining glory over the tops of trellises. Camellias are just coming in, except for *oleifera* which is in full flower—like Cherokee roses in bloom—and the few earlier Sasanquas.

"The roadsides are fine with all sorts of eupatoriums, helianthus, gerardias just gone by, asters, but not as lovely as north, chrysogonums galore, and the ending of *Clinopodium coccineum,* which Dr. Small does not report for Mississippi but which is here just the same in thin poor dry woods. Boltonia and some other familiar things are now over, but in some cut-over areas some of the spring and early summer flowers are trying to bloom again.

"Of course, my own work with azaleas is too personal and presumably too biased, but the new things are so lovely and the races of doubles continue to delight me though actually, I guess, I like the singles better. This small strip along the Gulf, both in soil and climate, has so little in relation to any other area that we could almost be an island. . . ."

First All-America Chrysanthemums. Four hardy garden varieties have been selected as the first All-America chrysanthemums—chosen after three years of testing and scoring new seedling varieties in trial gardens. 'Showpiece,' with large four-inch shapely flowers of a royal rose misted with silver on petal reverses and centers, makes a wonderful display in the garden by late September and lasts a long time in arrangements. 'Burning Bronze' bears two and a half inch flowers on vigorous thirty-inch high plants. The mahogany bronze blooms with a glowing scarlet base are stunning in bronze, copper, brass or pewter containers. 'Emperor' furnishes in late September light and airy sprays of flat flowers in bright bronze with orange tints and the richest of yellows. The plant is a vigorous grower of medium height and generous spread. The compact mounded plants of 'Ruby King' are covered with one and a half to two inch blooms from late September or very early October for a full month and usually last till freezing weather; buds are frost tolerant. This plant can be used effectively in bordering walks and drives, as an accent at entrances or in the perennial border and in the foreground of foundation plantings.

The 1957 chrysanthemum border at The New York Botanical Garden contains some fine varieties furnished by George Rose, Chairman of the Mum Trial Grounds Committee, All-America Selections, including 'Flamboyant' and 'Coquette' from Bristol Nurseries, Bristol, Conn., 'Golden Age' from Grande Mere Nurseries at Miles, Mich., and 'Adorable,' 'Bronze Giant,' 'Delight,' 'Golden Fantasy,' 'Granny Lehman,' 'White Sail,' 'Crimson Glory,' 'Apache,' 'Indian River,' and 'Purple Waters' from Lehman's Garden, Faribault, Minn. The last in Mr. Rose's opinion is the finest of all royal purple mums, while he rates 'Granny Lehman' as one of the finest whites and very early. These chrysanthemums performed most satisfactorily in the Garden's border this fall.

EVOLUTION OF GARDENS (from page 8)

nations had their expeditions and their individual explorers in the field. But certainly the English have been ahead in this, and a catalogue of their introductions is sufficient to illustrate how modern horticulture has drawn on the rest of the world.

And what of North American plants? It is a curious thing that we have gone to Europe to fill our gardens with plants from Asia and Africa, largely to the neglect of our own. The colonists brought their garden flowers with them, and their attitude towards the wildings they found was perhaps much like that of my rural Wisconsin friends. That "weeds" were not without honor away from home is seen in many English borders, where our goldenrods are cultivated. The wild New England aster was the parent of the Michaelmas daisies—re-introduced into America as the "hardy asters." Many lovely plants of our midwestern prairies, of our western and southwestern mountains await recognition in our gardens.

to be continued

BOOK REVIEWS (from page 32)

characterizes many of the definitions.

Plasmagenes are defined as follows: "Genetic determinants in the broadest sense." Quite aside from the fact, perhaps irrelevant, that the concept of the plasmagene is a controversial one, such a definition can scarcely be regarded as informative. *Neurospora crassa* is defined in part as "A fungus which can synthesize tryptophane from indole and L-serine." True as this statement may be, it does not distinguish *N. crassa* from the many other fungi which may synthesize tryptophane in the same way. Metulae are defined merely as "short branches of a mold." However, ramus and ramulus are rightfully defined. The definition of mutation is very confused: "A random strain, variation or characteristic appearing suddenly in a species. The changes in the strain are persistent, inheritable variations attributable to intrinsic factors arising possibly as a result of external influence. A change in a gene potentially capable of being transmitted."

Unless the looseness and inaccuracy that is characteristic of all too many of the definitions is eliminated, this book cannot be recommended without reservation.

ALMA W. BARKSDALE

EXOTIC PLANTS OF THE WORLD. Translated by Anthony J. Huxley. 93 pages, illustrated in color and black and white. Hanover House, Doubleday, Garden City, N. Y. 1957. $4.95

This magnificent picture book with nothing to recommend it except beauty of blossom and excellence of printing, presents only a modicum of horticultural background to explain the exquisite pictures. Almost without exception it is botanically accurate; the only jarring note is the photo on page fifty-five labelled *Mangifera indica.* It is lovely but it is not a picture of a mango flower and leaf.

This is the sort of book one would like to find in physicians' waiting rooms instead of last year's issues of Life.

Edwin A. Menninger
Stuart, Florida

AMERICAN ROSE ANNUAL, 1957. 264 pages with 20 color plates. Published by the American Rose Society, Columbus, Ohio. With membership, $5.50.

If roses could talk, many would raise their thorny heads to agree with Dr. Cynthia Westcott who claims in her article, "Are You Your Garden's Biggest Pest?" that roses everywhere suffer from "smother love." Consider an instance she cites in which the gardener was replaced by a once-a-week handyman who, under instructions of the lady of the house, covered the rose bushes with a foot of manure for the winter. By spring, many canes and a number of bushes were dead. In another instance, the master of the house could not bear to see his darling roses naked all winter, so provided them with swaddling

clothes of salt hay. Field mice moved in and had a field day gnawing around the stems, so that many bushes died, others had only one cane left.

In spite of these experiences, Dr. Westcott, of course, works over her roses religiously, adhering strictly to a spray schedule which keeps the plants healthy, and outlines in her article eight precautions to take to avoid difficulties in the use of modern insecticides.

One of the two dozen articles in this Annual is a significant piece on tree roses by Melvin Wyant. Regarding winter care, Mr. Wyant warns that whereas many tree roses will come through this winter climate in Ohio without protection, the only sure way is to cover the plants. One method is to loosen the soil and roots on one side of the plant, bend the plant way over, and lay it on the ground. Cover completely with soil, and keep covered all winter. In spring, straighten the tree up, tramp the soil down, and stake.

In his article on "Perpetual Pruning," Dr. Allen D. Albert, Jr., of Atlanta, Ga., explains his system of moderate pruning of old wood in spring followed by vigorous pruning of old wood in June to stimulate new growth from the base. By constantly renewing his plants, growth is better, flowers more abundant, and the plants healthier.

This Annual contains many other stimulating articles. Ralph S. Moore outlines the history of his work in breeding miniature roses; Prof. A. F. DeWerth suggests slashing with a sharp knife the roots of roses around the outer edge of the ball of soil, when roses are removed from cans or other containers. By doing this before planting, root activity is stimulated.

The last ninety-odd pages of this book are devoted to critical comments by growers all over the country on about two hundred varieties of recent introduction. Amateurs use this information as a guide to buying the best new roses.

Paul F. Frese
White Plains, N. Y.

JOHN AND WILLIAM BARTRAM'S AMERICA. Edited by Helen G. Cruickshank. 418 pages, illustrated by Francis Lee Jacques; indexed. Devin-Adair, New York. 1957. $5

This is a delightful book, in some places as exciting as a novel of adventure. Its over four hundred pages give a remarkable impression of our southern wilderness two centuries ago, the topography and natural features such as lakes, streams, swamps and savannahs, and the birds, insects, fishes and animals. There is much about the Indians, their history and their dealings with the traders. There is, regretfully to this reviewer, rather scant mention about plants, particularly those discovered by, or first introduced by, the elder Bartram which have so greatly enriched our gardens.

The book deals with natural history in general rather than in gardening. This is borne out by the selection of illustrations. There are twelve beautiful photographic reproductions of William Bartram's drawings but they are mostly of birds, snakes and fishes. Only three are of plants. The eighteen charming line drawings by Francis Lee Jacques also are mostly of birds, but thankfully there is included the most famous of the Bartram botanical discoveries and horticultural introductions, the Franklin tree.

There is a brief account of its discovery and constant mention of the magnificence of the forest with its great magnolias, sweet and sour gums, bald cypress, walnut, chestnut, and various oaks.

William Bartram's reverence for nature and his love for all wild life, and his spritual and religious views are apparent on almost every page. He mentions with particular reverence not only the beauty of the landscape in the calm of the moonrise but also in uninhibited torrential downpours and hurricane winds. More than once he criticizes his companions for killing deer or bears for sport, rather than for food or in self-protection.

The places visited upon his journeys are fully described, but they are not discussed in particular chronological or geographical sequence so that the reader is often confused. Had the places and dates been made clearer in the text rather than in the Introduction or the Appendix, it would have been easier to read.

The introduction and biographical sketches give the background of the two men and recount their various achievements. This reviewer was particularly pleased with the emphasis in the introduction that the two Bartrams two centuries ago held what we now call the "modern" belief that man should use his environment "wisely and not abuse it."

Referring to British planters of orange groves, the editor includes this quotation from "The Travels"—

> "I have often been affected with extreme regret at beholding the destruction and devastation which has been committed or indiscreetly exercised . . . Some plantations have not a single tree (of the native forest) left."

And this two centuries before the era of the superhighway and the bulldozer!

My attention has been called to two minor mistakes which should be corrected in the next printing. John Bartram's first wife was Mary Maris — not Morris. The date of the publication of "The Travels" is given as 1791 in London. It should be 1791 in Philadelphia, and 1792 in London.

In relating how the Bartram House and garden were saved from destruction and made a park, it is to be regretted that the work of the John Bartram Association, which during the last half century has done so much to make possible the restoration, is not mentioned.

These are minor matters. The book is fascinating in its presentation of our country two centuries ago, and deserves wide reading and recognition.

John C. Wister
Former President, John Bartram Association
Swarthmore, Pa.

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MUSHROOMS (from page 5)

tecs," Botanical Museum Leaflet, Harvard University, vol. 7, no. 3, Feb. 21, 1939. See fnt. 2, p. 47. Letter was from Reko to J. N. Rose, U.S. National Museum, July 18, 1923, herbarium sheet no. 1745713, U.S. National Herbarium, Washington, D. C.

6. Reko says he shipped the mushrooms to The New York Botanical Garden as well as Harvard University; **Mitobotánica Zapoteca**, p. 53. There is no record of them in the Garden. If they were received, they were probably in such bad condition that they were not preserved and no record was kept.

7. Shultes, Richard Evans: "Peyote and Plants Used in the Peyote Ceremony," Botanical Museum Leaflet, Harvard University, vol. 4, no. 8, April 12, 1937, pp. 136-7; "Peyote (**Lophophora Williamsi**) and Plants Confused with It," Botanical Museum Leaflet, Harvard University, vol. 5, no. 5, Nov. 19, 1937, pp. 69-73.
La Barre, Weston: "Native American Beers," American Anthropologist, n.s. vol. 40, April-June, 1938, p. 234, ftn. 37; "The Peyote Cult," Yale University Publications in Anthropology No. 19, 1938, p. 7 and App. 3.

8. Shultes, Richard Evans: Botanical Museum Leaflet, Harvard University, vol. 7, no. 3, Feb. 21, 1939, "The Identification of Teonanacatl;" also American Anthropologist, n.s. vol. 42, 1940, "Teonanacatl, the Narcotic Mushroom of the Aztecs," pp. 429-443, and Johnson's comments thereon, pp. 449-450.

9. "The Agaricales (Mushrooms) in Modern Taxonomy," **Lilloa**, Tomo xxii, University of Tucumán, Argentina, 1949, issued in June, 1951; p. 506.

10. Johnson, Jean Bassett: "The Elements of Mazatec Witchcraft," Ethnological Studies, 9, 1939, Gothenburg Ethnographical Museum, Sweden.

11. Wasson, V. P., and Wasson, . G.: Mushrooms Russia and History, Pantheon Books, N. Y., 1957. Also **Life**, May 13, 1957, (International Edition, July 10, 1957; **Life en Espanol**, June 3, 1957). Also This Week, June 19, 1957.

12. "Mushroom Ceremony of the Mazatec Indians in Mexico," with commentary and translation, Folkways Record & Service Corporation, 117 West 46 St., N.Y. 36, N.Y. The record bears the listing FR8975.

13. Heim, Roger: **Comptes rendus, Académie des Sciences**, tome 242, pp. 965-968, session of Feb. 20, 1956; pp. 1389-1395, session of March 12, 1956; tome 244, pp. 695-700, session of Feb. 4, 1957; in collaboration with Roger Cailleux, pp. 3109-3114, session of June 24, 1957; tome 245, pp. 597-603, session of Aug. 5, 1957; Also, **Revue de Mycologie, "Notes préliminaires sur les Agarics hallucinogénes du Mexique,"** tome xxii, fasc. 1, May 15, 1957, pp. 58-79; fasc. 2, Sept. 15, 1957, pp. 183-207. These two contributions are available in a separate publication of the **Laboratoire de Cryptogamie, Muséum National d'Histoire Naturelle."** As we went to press, a further **Comptesrendus** concerning our mushrooms was scheduled for presentation to the Académie des Sciences by Professor Heim on Nov. 13, 1957.

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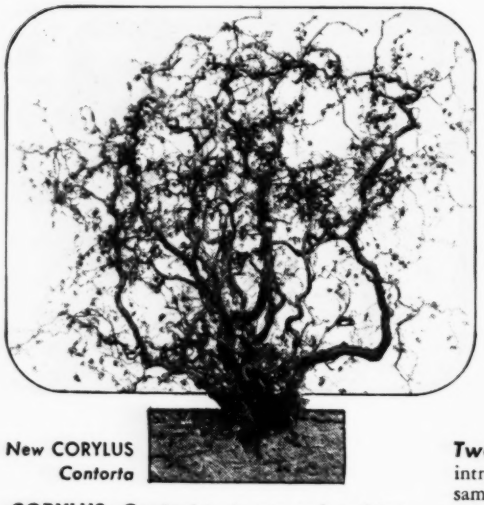

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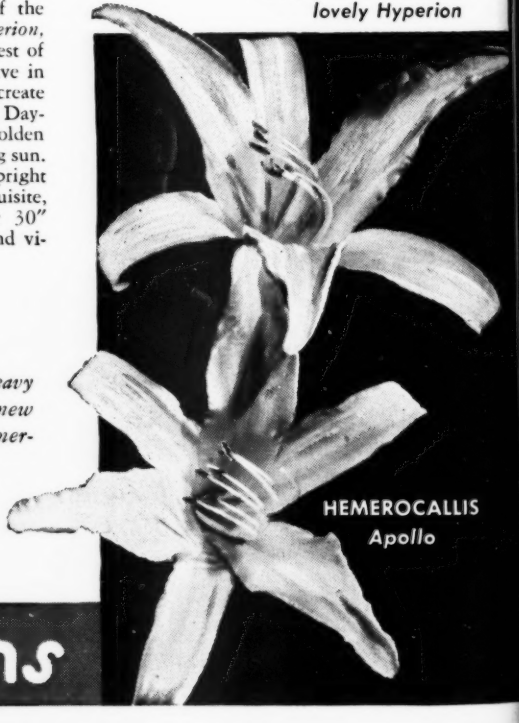

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